Oral health in Older People: impact on diet and quality of life

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Topics

1. The importance of the ageing population
2. Oral health issues in older patients
3. Links between oral and systemic health
4. Relationships between oral health and diet
5. Impacts of oral health and tooth loss on quality of life

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UK faces 'crippling' tax rises and spending cuts to fund pensions and healthcare

Britain faces tax rises within two years equivalent years to more than 17pc of GDP, says Institute of Economic Affairs

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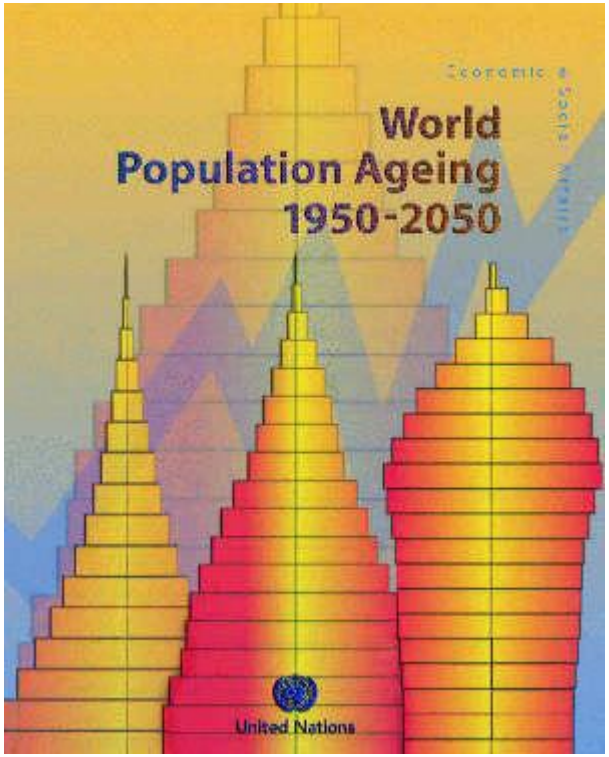
Demographic Change: the ageing population

- Worldwide, the population is ageing
- “Demographic Transition”
- Fertility rates declining
- International migration
- **Dramatically increased life expectancy**

United Nations Department of Economic and Social Affairs 2001



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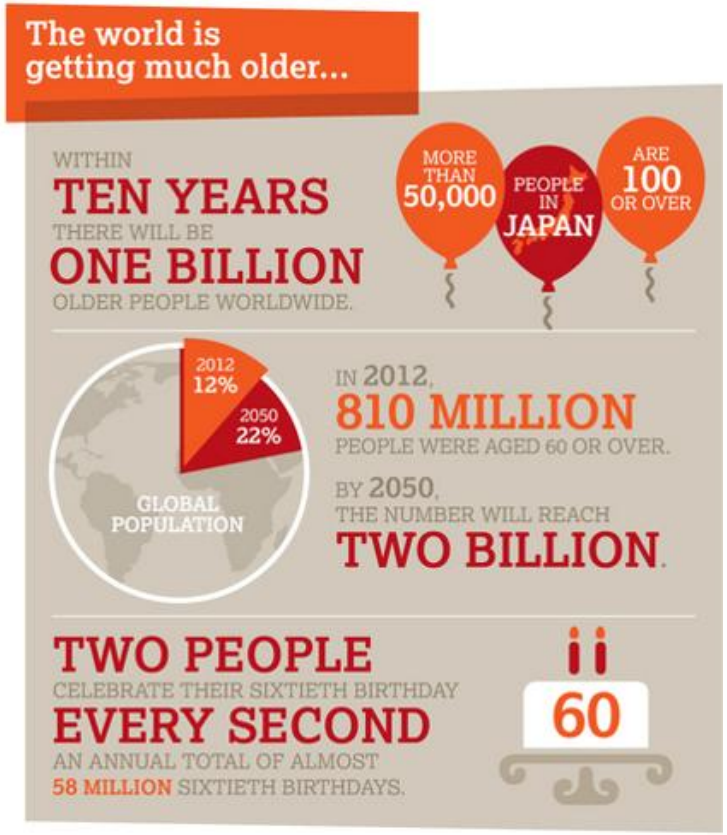
Life Expectancy

- 3 out of every 4 new-borns will live to 60 years
- 1 in 3 new-borns will live to 80
- **By 2045, global life expectancy will reach 76.0 years**

National Research Council 2001



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Oldest Adults

- Not only are more people surviving to old age, **but once there they live longer**
- The older the age group the more marked the expected gains in live expectancy
- Over the next 50 years average life expectancy at 80 years will increase by 27% as compared with 19% at 60 years and 9% at birth

United Nations Department of Economic and Social Affairs 2001

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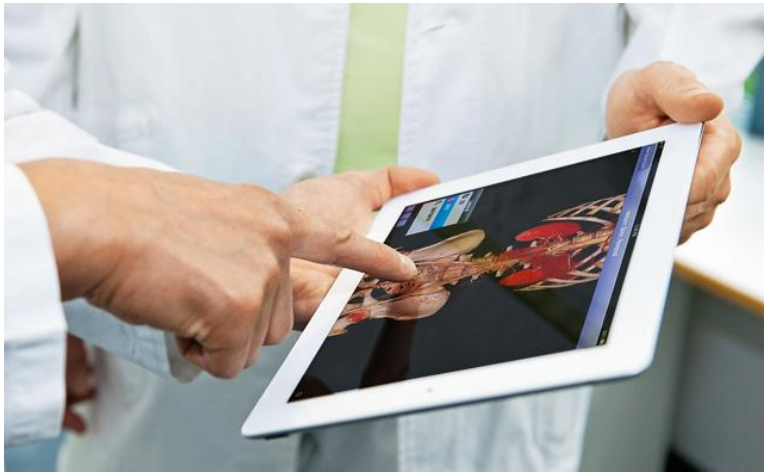
Why is life expectancy increasing?

- Increasing prosperity
- Education
- Public hygiene
- Improved housing
- Social welfare policy
- **Advances in healthcare**



Ableson 1993; Hitchings 2013

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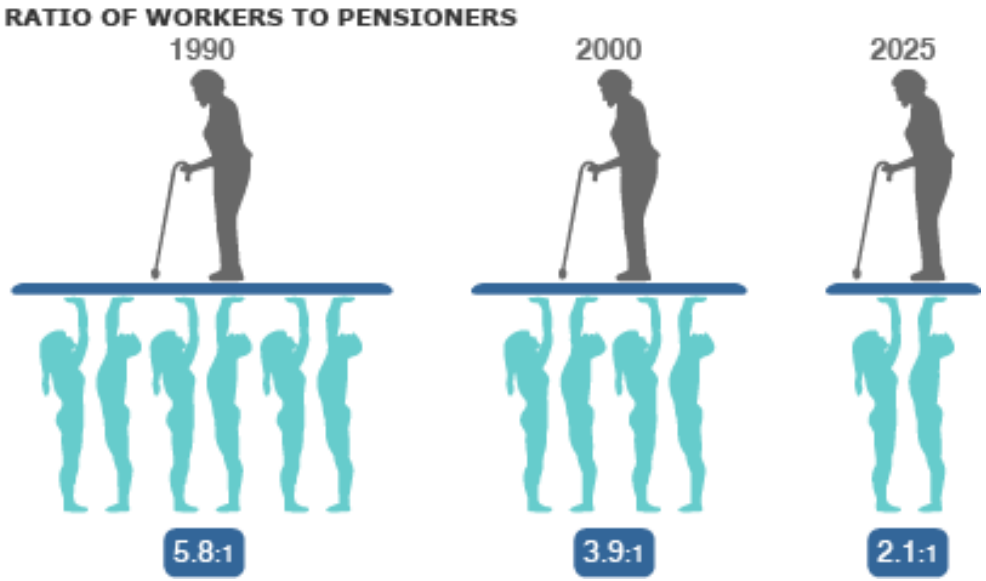
Implications?



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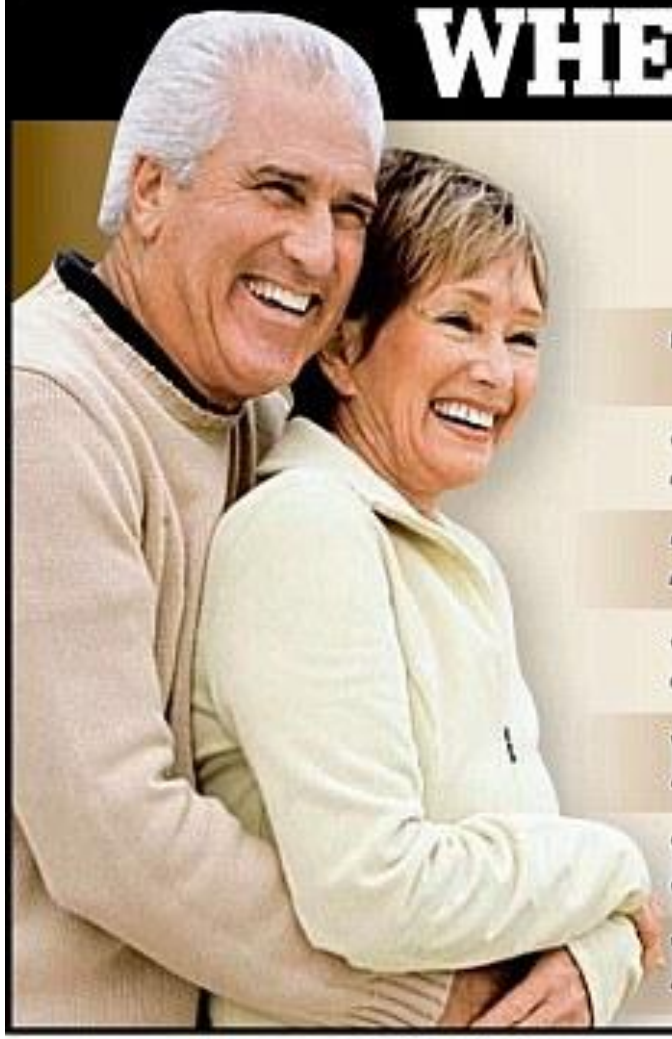
WHEN WILL YOU RETIRE?



	CURRENT		PROJECTED	
	Men	Women	Men	Women
Today	65	62	65	62
2016	65	63	65	63
2020	66	66	66	66
2028	67	67	67	67
Mid 2030s	67	67	68	68
Mid/late 2040s	68	68	69	69
Early 2060s	N/A	N/A	70	70

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The oral health of older adults

- Significant improvements in the oral health of older adults
- Increased tooth retention
- Reduced rates of edentulousness
- Changing attitudes
- **Partially dentate elderly**

Whelton, O'Mullane et al. 2007, Kelly, Steele et al. 2011

Guarnizo-Herreño et al. BMC Public Health 2014, 14:827
http://www.biomedcentral.com/1471-2458/14/827

BMC Public Health

RESEARCH ARTICLE Open Access

Socioeconomic position and subjective oral health: findings for the adult population in England, Wales and Northern Ireland

Carol C Guarnizo-Herreño[1*], Richard G Watt[2], Elizabeth Fuller[2], Jimmy G Steele[3], Jing Shen[4], Stephen Morris[5], John Wildman[6] and Georgios Tsakos[1]

Abstract

Background: The objective of this study was to assess socioeconomic inequalities in subjective measures of oral health in a national sample of adults in England, Wales and Northern Ireland.

Methods: We analysed data from the 2009 Adult Dental Health Survey for 8,765 adults aged 21 years and over. We examined inequalities in three oral health measures: self-rated oral health, Oral Health Impact Profile (OHIP-14), and Oral Impacts on Daily Performance (OIDP). Educational attainment, occupational social class and household income were included as socioeconomic position (SEP) indicators. Multivariable logistic regression models were fitted and from the regression coefficients, predictive margins and conditional marginal effects were estimated to compare predicted probabilities of the outcome across different SEP levels. We also assessed the effect of missing data on our results by re-estimating the regression models after imputing missing data.

Results: There were significant differences in predicted probabilities of the outcomes by SEP level among dentate, but not among edentate, participants. For example, persons with no qualifications showed a higher predicted probability of reporting bad oral health (9.1 percentage points higher, 95% CI: 6.54, 11.68) compared to those with a degree or equivalent. Similarly, predicted probabilities of bad oral health and oral impacts were significantly higher for participants in lower income quintiles compared to those in the highest income level ($p < 0.001$). Marginal effects for all outcomes were weaker for occupational social class compared to education or income. Educational and income-related inequalities were larger among young people and non-significant among 65+ year-olds. Using imputed data confirmed the aforementioned results.

Conclusions: There were clear socio-economic inequalities in subjective oral health among adults in England, Wales and Northern Ireland with stronger gradients for those at younger ages.

Keywords: Oral health, Health inequalities, Adults, Socio-economic factors, Quality of life, Oral health-related quality of life

Background

The association between oral health and socioeconomic position (SEP) has been well established [1-6]. Research has shown consistent inequalities with individuals in lower SEP being more likely to have poorer oral health, as measured by both clinical and subjective indicators [1-13]. Moreover, these socioeconomic inequalities frequently follow a gradient with worse oral health at successively lower socioeconomic position levels [11-17]. Similarly to inequalities in general health, the underlying causes of oral health inequalities are related to systematic social disadvantages and differential access to key resources for health [18-21]. Specifically, studies have indicated that access to material resources, knowledge-related resources and the relative position in the society play a role in the distribution of oral health [22-26].

In the UK, despite a general improvement in adult oral health during the past decades, socioeconomic inequalities in oral health persist [27,28]. Evidence from national oral health surveys has shown consistent inequalities with

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Changing clinical picture

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Residential care homes

- **Approximately 40% of residential care patients have some remaining natural teeth**
- Provision of care can be challenging
- Variation in delivery of care
- Often emphasis on symptomatic relief and not prevention
- Education of care and medical staff required

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Managing older teeth

- Managing natural teeth is challenging
- Increased incidences of **chronic dental diseases**: tooth decay (caries), periodontitis (gum disease)
- Older dentate adults report an average of 1.5 decayed teeth and a high prevalence of root caries. *Kelly, Steele et al. 2000*
- The 2009 UK Adult Dental Health Survey reported that 27% of adults aged 65-74 years had evidence of dental caries whilst this figure increased to 40% for those aged 75-84 years. *Fuller, Steele et al. 2011*

Caries

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The challenging oral environment

- **Fermentable carbohydrates fuel cariogenic bacteria**
- Root surfaces are particularly prone to decay
- Tooth brushing and cleaning is compromised by reduced manual dexterity
- Removable dentures used to replace missing teeth can further complicate cleaning

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Dry mouth

- Complaints of a dry mouth and diminished salivary output are common in older populations
- Older adults experience dry mouth for a variety of reasons
- **Medications:** up to 80% of prescription medications can cause xerostomia e.g anticholinergics, tricyclic antidepressants, sedatives, tranquilizers, antihistimines, antihypertensives
- Radiation therapy
- Systemic diseases: Sjogrens syndrome, Diabetes, Alzheimers disease.

Dental interventions

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The cost of oral care

- Oral disease affects 3.9 billion people worldwide
- Management of Oral Disease accounts for 5% of public health spending across European Union
- **The cost of oral care in the EU was €54 billion in 2000, projected €93 billion by 2020**
- Evidence of inequality of access to oral healthcare for the elderly

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Links between oral and systemic disease

- Oral diseases have common risk factors with many chronic systemic diseases (smoking, diet, age, glycaemic control)
- Possible **bidirectional relationships** with:

1. Type 2 Diabetes
2. Cardiovascular disease
3. Respiratory disease

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Oral Function

- As natural teeth are lost, oral function is negatively affected
- Chewing ability is reduced
- Reduced bite forces
- **Impact on food choices**
- Impaired masticatory ability is associated with reduced nutrient intake, poor nutritional status and subsequent health

Geissler and Bates 1984; Brodeur, Laurin et al. 1993; Joshipura, Rimm et al. 1996

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Nutritional status

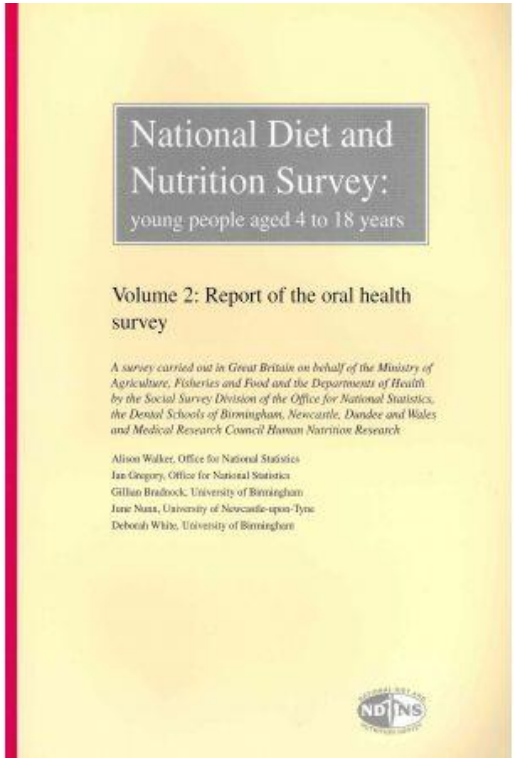
- Diet plays a key role in disease prevention in older age, as poor diet has been linked to illnesses such as osteoporosis, atherosclerosis and bowel disease.
- **Poor oral health and loss of teeth, can have very significant negative effects on dietary intake and nutritional status for elderly patients**
- The American Dietetic Association has stated that oral health and nutrition have a “synergistic bidirectional relationship”

Moynihan 2007; Touger-Decker and Mobley 2007

The UK National Diet and Nutrition Survey

- Patients aged 65 years and older
- Assessed oral health
- Dentate individuals had **higher daily intakes of protein, fibre, calcium, iron and vitamin C** than their edentulous counterparts
- Preservation of a critical number of natural, disease free teeth is a significant factor facilitating a healthy diet

Steele 1998



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Quality of Life

- WHO defines Quality of Life as “an individuals’ perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns”.
- It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment.

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QOL in Healthcare Management

- **Purely clinically based indictors of disease are insufficient when assessing health status and treatment outcomes**
- Adaptive capacity and personal characteristics appear to influence patient's response to chronic disease
- Patients with serious illness can rate their quality of life as better than healthy individuals
- Patients' assessment of their health related quality of life is often markedly different to the opinion of health care professionals

Decker, Schultz et al. 1989; Sprangers and Aaronson 2012

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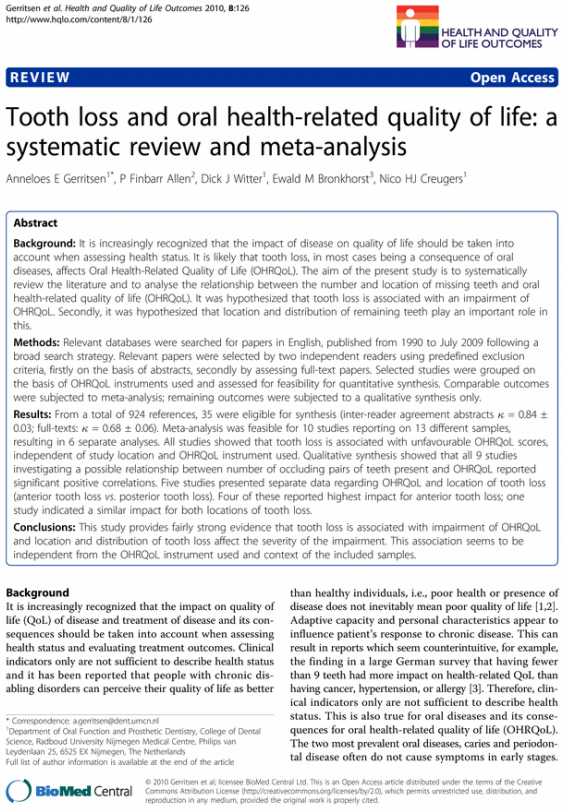
Impact of toothloss on QOL

- **Loss of natural teeth is directly and negatively associated with OHrQOL**
- A complete set of natural teeth is associated with best OHrQOL
- Poor oral health status has a negative impact on QOL

Gerritsen, Allen et al. 2010



Gerritsen *et al. Health and Quality of Life Outcomes* 2010, **8**:126
http://www.hqlo.com/content/8/1/126

HEALTH AND QUALITY OF LIFE OUTCOMES

REVIEW Open Access

Tooth loss and oral health-related quality of life: a systematic review and meta-analysis

Anneloes E Gerritsen[1*], P Finbarr Allen[2], Dick J Witter[1], Ewald M Bronkhorst[3], Nico HJ Creugers[1]

Abstract

Background: It is increasingly recognized that the impact of disease on quality of life should be taken into account when assessing health status. It is likely that tooth loss, in most cases being a consequence of oral diseases, affects Oral Health-Related Quality of Life (OHRQoL). The aim of the present study is to systematically review the literature and to analyse the relationship between the number and location of missing teeth and oral health-related quality of life (OHRQoL). It was hypothesized that tooth loss is associated with an impairment of OHRQoL. Secondly, it was hypothesized that location and distribution of remaining teeth play an important role in this.

Methods: Relevant databases were searched for papers in English, published from 1990 to July 2009 following a broad search strategy. Relevant papers were selected by two independent readers using predefined exclusion criteria, firstly on the basis of abstracts, secondly by assessing full-text papers. Selected studies were grouped on the basis of OHRQoL instruments used and assessed for feasibility for quantitative synthesis. Comparable outcomes were subjected to meta-analysis; remaining outcomes were subjected to a qualitative synthesis only.

Results: From a total of 924 references, 35 were eligible for synthesis (inter-reader agreement abstracts $\kappa = 0.84 \pm 0.03$; full-texts: $\kappa = 0.68 \pm 0.06$). Meta-analysis was feasible for 10 studies reporting on 13 different samples, resulting in 6 separate analyses. All studies showed that tooth loss is associated with unfavourable OHRQoL scores, independent of study location and OHRQoL instrument used. Qualitative synthesis showed that all 9 studies investigating a possible relationship between number of occluding pairs of teeth present and OHRQoL reported significant positive correlations. Five studies presented separate data regarding OHRQoL and location of tooth loss (anterior tooth loss *vs.* posterior tooth loss). Four of these reported highest impact for anterior tooth loss; one study indicated a similar impact for both locations of tooth loss.

Conclusions: This study provides fairly strong evidence that tooth loss is associated with impairment of OHRQoL and location and distribution of tooth loss affect the severity of the impairment. This association seems to be independent from the OHRQoL instrument used and context of the included samples.

Background

It is increasingly recognized that the impact on quality of life (QoL) of disease and treatment of disease and its consequences should be taken into account when assessing health status and evaluating treatment outcomes. Clinical indicators only are not sufficient to describe health status and it has been reported that people with chronic disabling disorders can perceive their quality of life as better than healthy individuals, i.e., poor health or presence of disease does not inevitably mean poor quality of life [1,2]. Adaptive capacity and personal characteristics appear to influence patient's response to chronic disease. This can result in reports which seem counterintuitive, for example, the finding in a large German survey that having fewer than 9 teeth had more impact on health-related QoL than having cancer, hypertension, or allergy [3]. Therefore, clinical indicators only are not sufficient to describe health status. This is also true for oral diseases and its consequences for oral health-related quality of life (OHRQoL). The two most prevalent oral diseases, caries and periodontal disease often do not cause symptoms in early stages.

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Clinical Research

Research Questions

In partially dentate older patients what is the impact of tooth replacement on:

1. Quality of life
2. Nutritional Status

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Methodology

Assessed for eligibility
(n=183)

Enrollment

Excluded:
Not meeting inclusion criteria
(n=27)
Declined to participate (n=24)

Randomised (n=132)
Stratified for age and gender

SDA GROUP (n=67)

Allocation

RPD GROUP (n=65)

Data collected:
- Baseline
- 1 month post treatment
- 6 months post treatment
- 12 months post treatment

Follow-Up

Data collected:
- Baseline
- 1 month post treatment
- 6 month post treatment
- 12 months post treatment

Analysed (n=46)
Lost to follow-up (n=21)
Excluded from analysis (n=0)

Analysis

Analysed (n=44)
Lost to follow-up (n=21)
Excluded from analysis (n=0)

The Shortened Dental Arch

- Developed in the Netherlands in 1980s
- Treatment directed towards the front of the mouth
- **Molar teeth not replaced**
- Missing anterior teeth replaced with fixed bridges instead of removable dentures
- Simplified maintenance

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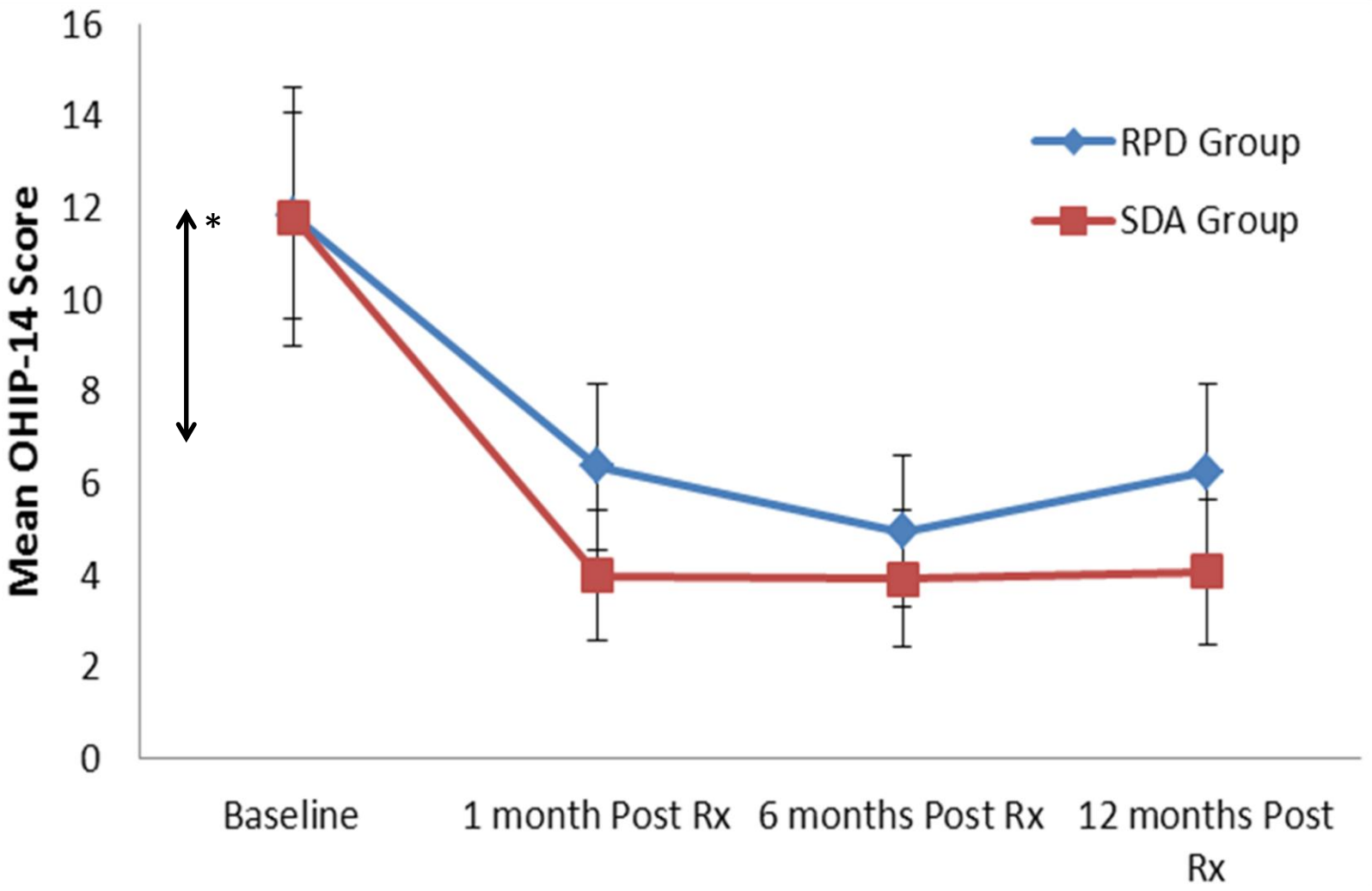
Results: Oral Health related Quality of Life



*A reduction of 5 scale points represents the Minimally Important Clinical Difference (MID)

Available online at www.sciencedirect.com

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journal homepage: www.intl.elsevierhealth.com/journals/jden

The impact of rehabilitation using removable partial dentures and functionally orientated treatment on oral health-related quality of life: A randomised controlled clinical trial

Gerald McKenna [a,*], *P. Finbarr Allen* [a], *Denis O'Mahony* [b], *Michael Cronin* [c], *Cristiane DaMata* [a], *Noel Woods* [d]

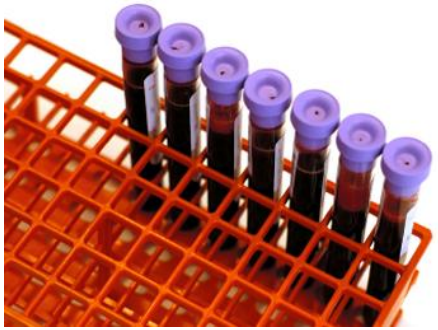
Conclusions: In terms of impact on OHRQoL, treatment based on the SDA concept achieved significantly better results than that based on RPDs 12 months after treatment intervention (trial registration no. ISRCTN26302774).

Clinical significance: Functionally orientated treatment delivery resulted in significantly better outcomes compared to removable dentures in terms of impact on OHRQoL.

Data Collection: Nutritional Status

- Mini Nutritional Assessment (MNA)
- Short Form Mini Nutritional Assessment (MNA-SF)
- Haematological samples:
  - Vitamin B12
  - Folate
  - Ferritin
  - Vitamin D
  - Albumin
  - Cholesterol
  - C-Reactive Protein

Nestlé Nutrition Institute



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Clin Oral Invest
DOI 10.1007/s00784-015-1409-4

ORIGINAL ARTICLE

Impact of tooth replacement on the nutritional status of partially dentate elders

Gerald McKenna · P. Finbarr Allen · Denis O'Mahony · Michael Cronin · Cristiane DaMata · Noel Woods

Conclusion Tooth replacement using conventional and functionally orientated treatment for the partially dentate elderly showed significant improvements in MNA score 12 months after intervention.
Clinical relevance Prosthodontic rehabilitation may play an important role in the nutritional status of partially dentate elders.

JOURNAL OF DENTISTRY 42 (2014) 653–659

Available online at www.sciencedirect.com

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journal homepage: www.intl.elsevierhealth.com/journals/jden

Comparison of functionally orientated tooth replacement and removable partial dentures on the nutritional status of partially dentate older patients: A randomised controlled clinical trial

Gerald McKenna [a,*], *P. Finbarr Allen* [a], *Denis O'Mahony* [b], *Albert Flynn* [c], *Michael Cronin* [d], *Cristiane DaMata* [a], *Noel Woods* [e]

Conclusions: The only measure which illustrated consistent significant improvements in nutritional status for either group were Vitamin D levels. However no significant difference was recorded between the two treatment groups.

Clinical significance: Functionally orientated prosthodontic rehabilitation for partially dentate older patients was no worse than conventional removable partial dentures in terms of impact on nutritional status.

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Ongoing work: Collaboration

- Collaborators: Professor Jayne Woodside, Dr Laura McGowan
- **Focus on coupling oral rehabilitation with nutritional counselling for older patients**
- To develop and pilot-test a habit-based tailored dietary intervention, in conjunction with oral rehabilitation, and to examine its impact on positive dietary habit-formation amongst partially dentate older adults
- Funded by the HSC R&D Division and the Health Service Executive Research Awards on Ageing

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My Conclusions

- Demographic transition is continuing at pace
- Management of older patients is increasingly costly
- Few publically funded healthcare systems, such as the NHS, are equipped to cope
- Oral health plays a vital role in diet and Quality of Life in older patients
- Tooth replacement can have positive impacts on Quality of Life
- Tooth replacement alone does not impact positively on nutritional status

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