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Tooth replacement for partially dentate elders: A willingness-to-pay analysis

G. McKenna, Senior Lecturer/Consultant[a,*], S. Tada, Researcher[b], N. Woods, Centre Director[c], M. Hayes, Lecturer in Restorative Dentistry[d], C. DaMata, Lecturer in Restorative Dentistry Cork[e], P.F. Allen, Professor of Prosthodontics and Oral Rehabilitation[d]

[a] Centre for Public Health, Queens University Belfast, United Kingdom
[b] Department of Prosthodontics, Gerodontology and Oral Rehabilitation, Osaka University, Japan
[c] Centre for Policy Studies, University College Cork, Ireland
[d] Cork University Dental School and Hospital, University College Cork, Ireland
[e] University Dental School and Hospital, University College Cork, Ireland

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ABSTRACT

Objectives: The primary aim of this study was to investigate partially dentate elders' willingness-to-pay (WTP) for two different tooth replacement strategies: Removable Partial Dentures (RPDs) and, functionally orientated treatment according to the principles of the Shortened Dental Arch (SDA). The secondary aim was to measure the same patient groups' WTP for dental implant treatment.
Methods: 55 patients who had completed a previous RCT comparing two tooth replacement strategies (RPDs (n = 27) and SDA (n = 28)) were recruited (Trial Registration no. ISRCTN26302774). Patients were asked to indicate their WTP for treatment to replace missing teeth in a number of hypothetical scenarios using the payment card method of contingency evaluation coupled to different costs. Data were collected on patients' social class, income levels and other social circumstances. A Mann-Whitney *U* Test was used to compare differences in WTP between the two treatment groups. To investigate predictive factors for WTP, multiple linear regression analyses were conducted.
Results: The median age for the patient sample was 72.0 years (IQR: 71–75 years). Patients who had been provided with RPDs indicated that their WTP for this treatment strategy was significantly higher (€550; IQR: 500–650) than those patients who had received SDA treatment (€500; IQR: 450–550) ($p = 0.003$). However patients provided with RPDs indicated that their WTP for SDA treatment (€650; IQR: 600–650) was also significantly higher than those patients who had actually received functionally orientated treatment (€550; IQR: 500–600) ($p < 0.001$). The results indicated that both current income levels and previous treatment allocation were significantly correlated to WTP for both the RPD and the SDA groups. Patients in both treatment groups exhibited little WTP for dental implant treatment with a median value recorded which was half the market value for this treatment (€1000; IQR: 500–1000).
Conclusions: Amongst this patient cohort previous treatment experience had a strong influence on WTP as did current income levels. Both treatment groups indicated a very strong WTP for simpler, functionally orientated care using adhesive fixed prostheses (SDA) over conventional RPDs.
Clinical significance: Partially dentate older patients expressed a strong preference for functionally orientated tooth replacement as an alternative to conventional RPDs.

1. Introduction

Management of oral care in older patients has significant health relevance with oral disease affecting an estimated 3.9 billion people worldwide [1]. The costs of care delivery and maintenance continue to increase dramatically which in turn has negative impacts on access to oral healthcare for older patients [2]. Across

* Corresponding author at: Centre for Public Health, Queens University Belfast, Institute of Clinical Sciences Block B, Grosvenor Road, Belfast BT12 6BJ, United Kingdom.
E-mail address: g.mckenna@qub.ac.uk (G. McKenna).

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many developed countries, increasing levels of natural tooth retention has given rise to a largely partially dentate older population. The effects of oral disease can be difficult and costly to manage in this cohort, with natural tooth loss affecting food choice, quality of life and general health [3]. Currently, there is a lack of understanding of the factors which influence partially dentate older patients' treatment choices, particularly those for replacing missing teeth.

In many countries, partially dentate older patients are currently provided with RPDs as conventional treatment to replace missing teeth. Implant retained prostheses are an alternative approach to help manage tooth loss, but they are currently very expensive [4]. Less complex, functionally orientated treatment solutions are very applicable to this population including the SDA concept which aims to provide patients with a functional dentition of 10 occluding pairs of teeth or contacts without the need for a RPD. By preserving mainly anterior teeth the SDA concept can offer patients an aesthetic result which they can easily maintain [5]. From a public health viewpoint, functionally oriented tooth replacement should be very attractive as recent studies have demonstrated its ability to provide an acceptable level of oral function in a more cost-effective manner than conventional alternatives [6,7].

Decisions about allocating resources between different tooth replacement strategies require evaluation to ensure the optimum health gain from any given budget. An important input into the decision making process is the value patients place on the services being considered [8]. One approach to revealing an individual's strength of preference is to determine a monetary valuation through the individual's expression of their WTP for the intervention. WTP is the most commonly accepted monetary valuation technique [9], where the respondent is presented with a hypothetical scenario in which a health care intervention or health state is to be valued and asked the maximum they would be willing to pay for the intervention or to improve their health state [10,11]. WTP is a form of contingency valuation (CV) that assigns monetary values to outcomes of health care in order to determine the net benefit. A relatively small number of oral healthcare investigations have utilised WTP methodology including Dixon and Shackley [12] who estimated the benefits of community water fluoridation; and Cunningham and Hunt [13] who investigated the relationship between utility values and WTP in patients undergoing orthognathic treatment. More recently Matthews et al. investigated WTP for a novel oral topical anaesthetic using the payment card method [14], Vernazza et al. investigated patient preferences for treatment of non vital teeth [15] and Srivastrava conducted a web-based survey to establish the WTP of individuals with natural teeth for mandibular two-implant overdentures [16]. Whilst the application of WTP in capturing patient preferences for oral health interventions has been established in previous studies valuation of preferences for RPDs and functionally orientated tooth replacement has not been undertaken.

The primary aim of this study was to elicit WTP values from partially dentate elders' for two different tooth replacement strategies: RPDs and, functionally orientated treatment according to the principles of the SDA. The secondary aim was to measure the same patient groups' WTP for dental implant treatment.

2. Methodology

Partially dentate patients aged 65 years and older were recruited from two centres: Cork University Dental Hospital (CUDH) and St Finbarr's Geriatric Day Hospital (SFDH) in Cork, Ireland. All of the patients included in the study had been provided with oral rehabilitation 24 months previously as part of a previous Randomised Controlled Clinical Trial comparing two tooth replacement strategies (RPDs and SDA) [6,7,17]. Patients were included in the original study if they had a minimum of 6 remaining natural teeth in one arch, no systemic medical conditions preventing routine dental treatment, no evidence of dementia, were able to have dental treatment in a dental chair and could communicate in English. Patients were randomly allocated to one of two treatment groups using a random number generator stratified for age and gender. Prior to prosthodontic rehabilitation all patients received routine dental care as required to render them dentally fit. Full ethical approval was provided by the Cork University Teaching Hospitals Ethical Approval Committee (ECM 5 (9(05/02/08). Patients assigned to Group 1 (Conventional treatment) had all missing natural teeth replaced using a RPD. Those assigned to Group 2 (Functionally orientated treatment) were restored to 10 occluding tooth contacts using fixed adhesive bridgework according to the principles of the SDA.

An open-ended CV method of questioning, using the payment card method, was used to elucidate from 55 patients their maximum WTP for treatment to replace missing teeth in a number of hypothetical scenarios, coupled to different costs (Fig. 1). In order to maximize the reliability of CV estimates the following checklist was used: pretesting the CV questionnaire on a focus group; face-to-face interviews; evaluation conducted by a blinded research assistant with no involvement in the previous RCT; breaking down WTP by a variety of respondent characteristics such as patient age, gender, social class (which was classified by data from longest held occupation), income levels (per year) and

Treatment	SDA	RPD	Dental Implant
Average cost (€)	450	600	2000
WTP (€)	300	300	500
	350	350	1000
	400	400	1500
	450	450	2000
	500	500	2500
	550	550	3000
	600	600	3500
	650	650	4000
	700	700	
	750	750	

Fig. 1. Payment card.