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A study of dentists' preferences for the restoration of shortened dental arches with partial dentures

Mohammad Zakaria Nassani[1], Shukran Ibraheem[1], Khaled Rateb Al-Hallak[1], Mohammed Othman Ali El Khalifa[1], Kusai Baroudi[1]

Correspondence: Dr. Mohammad Zakaria Nassani
Email: mznassani@hotmail.com

[1]Department of Restorative Dental Sciences, Al-Farabi Colleges, Riyadh, Saudi Arabia

ABSTRACT

Objective: This study aimed to use a utility method in order to assess dentists' preferences for the restoration of shortened dental arches (SDAs) with partial dentures. Also, the impact of patient age and length of the SDA on dentists' preferences for the partial dentures was investigated. **Materials and Methods:** Totally, 104 subjects holding a basic degree in dentistry and working as staff members in a private dental college in Saudi Arabia were interviewed and presented with 12 scenarios for patients of different ages and mandibular SDAs of varying length. Participants were asked to indicate on a standardized visual analog scale how they would value the health of the patient's mouth if the mandibular SDAs were restored with cobalt-chromium removable partial dentures (RPDs). **Results:** With a utility value of 0.0 representing the worst possible health state for a mouth and 1.0 representing the best, dentists' average utility value of the RPD for the SDAs was 0.49 (sd= 0.15). Mean utility scores of the RPDs across the 12 SDA scenarios ranged between 0.35 and 0.61. RPDs that restored the extremely SDAs attracted the highest utility values and dentists' utility of the RPD significantly increased with the increase in the number of missing posterior teeth. No significant differences in dentists' mean utility values for the RPD were identified among SDA scenarios for patients of different ages. **Conclusion:** Restoration of the mandibular SDAs by RPDs is not a highly preferred treatment option among the surveyed group of dentists. Length of the SDA affects dentists' preferences for the RPD, but patient age does not.

Key words: Dentists, partial denture, preferences, shortened dental arch, utility

INTRODUCTION

Current adult dental health surveys indicate a significant decline in the rate of complete edentulism and growing trend of retaining teeth later in life than ever before.[1-3] Such trend reflects the rapid advancement in dental care along with increased awareness of oral health among the public in our contemporary world. Thus in the near and long-term future, it can be speculated that dentists will face an increasing number of partially edentulous patients seeking replacement for their missing teeth and/or treatment for their remaining teeth. This highlights the need to efficiently prepare and train dentists to deal with the different scenarios of partial edentulism. In addition, research should be directed toward identifying the factors that may affect treatment decisions for partially edentulous patients in order to achieve better treatment outcomes.

A common partial edentulsim scenario is the shortened dental arch (SDA). This is a reduced dentition with missing posterior teeth and intact anterior teeth.[4] Such dental situation may develop in a considerable number of subjects because molar teeth are "high-risk teeth" and tend to be lost at an earlier stage than anterior and premolar teeth.[5-7] Kayser[4] estimated that the proportion of subjects with SDAs may reach 25% of the population in the age group 41–45 and it could become 70% in the age group 61–65.

Basically, treatment options for the management of SDAs include:

- Rehabilitation of the remaining dentition and

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stabilizing the occlusion without replacement of missing posterior teeth. This approach of treatment is known as the SDA concept. It aims at maintaining a functional dentition comprising the anterior and premolar teeth[4,8]
- Extending the SDA by a removable partial denture (RPD) prosthesis
- Extending the SDA by a cantilevered fixed dental prosthesis (either conventional or resin-bonded)
- Extending the SDA by an implant-supported prosthesis.

The debate about the most acceptable treatment option for the SDAs, functionally and esthetically, is still ongoing. Devlin[9] discussed the problems associated with making a treatment decision in subjects with free-end saddles that is, SDAs. He considered replacement of missing molar teeth in such patients as "a prosthodontic dilemma."

The RPD can be considered as the simplest and least costly prosthetic option for the SDAs. It was found to be the most popular prosthetic restoration for the SDAs in general dental practice in the UK.[10] However, Käyser *et al*.[11] considered the prosthodontic intervention to extend the SDA by a RPD a kind of "overtreatment." Also, the findings of clinical research cast doubt about the impact of RPD on oral functions when it was used to restore an SDA comprising 3–5 occlusal units (an occlusal unit is a pair of antagonist teeth that supports the occlusion, e.g., premolars and molars).[12-17] In addition, high failure rate, oral discomfort, and many problems were associated with RPDs that were used to restore the SDAs.[18] It is also believed that it is more appropriate to treat middle-aged and elderly SDA patients according to the SDA concept rather than to extend the SDA by a RPD. Elderly SDA subjects may feel more comfort to chew by their SDAs rather than by an SDA and a RPD.[19-21] In addition, cantilever resin-bonded fixed partial dentures achieved better treatment outcomes compared to mandibular RPDs when they were used to restore the SDAs.[22,23] Despite the aforementioned arguments, little is known about dentists' preferences for the RPD as a treatment option for the SDA. Also, it is not yet clear to what extent important factors such as length of the SDA and patient age, would affect dentists' preferences for the restoration of the SDAs by RPDs.

One of the common methods to assess dentists' treatment preferences is to measure the value they place on the outcome of treatment using the utility measurements. The utility concept indicates to "levels of subjective satisfaction, distress or desirability that people associate with a particular outcome."[24] The same authors stated that "utilities are defined as numbers that represent the strength of a person's preference for a particular outcome when faced with uncertainty." Therefore, according to this definition the best possible health outcome can take the value '1' while the worst possible health state will take the value '0.' The values of any intermediate outcomes will come between these two ends of the utility scale. A review of the medical and dental literature shows that several utility methods have been developed and used to evaluate treatment preferences. These include the rating scale, the standard gamble, the time trade-off and the willingness to pay.[25,26] The relative merits and limitations of these methods have been reviewed by Froberg and Kane,[27] whereas Matthews *et al*.[28] discussed their application in clinical decision making in dentistry and policy analysis.

The aim of this study was to use a utility method in order to assess dentists' preferences for the restoration of SDAs with partial dentures. Also, the impact of patient age and length of the SDA on dentists' preferences for the partial denture was investigated.

The examined hypostheses were: There are no differences in dentists' preferences for the RPD that restored SDAs of varying length, and there are no differences in dentists' preferences for the RPD that restored SDAs for patients of different ages.

MATERIALS AND METHODS

This study was approved by the Research Ethics Committee at Al-Farabi Colleges, Riyadh, Saudi Arabia. A list of teaching staff members working at Al-Farabi Colleges was obtained from the Directory of Teaching Staff, 2013–2014. Only those holding a Bachelor Degree in Dentistry or equivalent were eligible to participate (No = 138).

A special data collection form was developed and validated through a pilot study. The pilot study comprised 10 dentists and its aim was to evaluate the clarity of the described scenarios and the feasibility of the planned data collection form.

The study form presented four main scenarios for patients with complete maxillary dental arches and mandibular SDAs of different length. Under each main scenario, three sub-scenarios for SDA patients

of different ages (30, 50, 70 years old) were presented. The total number of the presented scenarios was 12 [Table 1].

Patients were described as fit and healthy. They had no problems with any of the remaining teeth or their supporting structures. The interarch space was described as adequate and the mandibular residual ridge as able to provide adequate denture support.

In order to measure the utility placed on each SDA scenario, dentists were asked to indicate on a standardized visual analogue scale (VAS) how they would value the health of the mouth if the posterior mandibular space was restored with a properly designed clasp-retained cobalt-chromium RPD. The VAS was a 10-cm horizontal line with two clear end-points [Figure 1]. The left end-point represented the worst health state or number zero. This point was labeled by the statement "the mouth could not be worse." On the other end of the line, the right-hand anchor or end-point represented the perfect health state. It was labeled by the statement 'The mouth could not be better'. Dentists were instructed to make a vertical mark on the line and at the point between the extremes which they felt represented the position of the scenario being described. The distance of the mark from the left-hand side of the VAS, in centimeters, divided by ten, comprised the utility score. The division by ten was in order that full health is represented by unity (value = 1) which is the accepted convention in utility measurement.[29]

Table 1: The shortened dental arch scenarios that were used in this study

	SDA scenarios	Label
Scenario 1	Maxillary complete dentition and mandibular SDA with missing second molar teeth	6-6
Sub-scenarios	The patient is aged 30 years	
	The patient is aged 50 years	
	The patient is aged 70 years	
Scenario 2	Maxillary complete dentition and mandibular SDA with missing molar teeth	5-5
Sub-scenarios	The patient is aged 30 years	
	The patient is aged 50 years	
	The patient is aged 70 years	
Scenario 3	Maxillary complete dentition and mandibular SDA with missing molars and second premolars	4-4
Sub-scenarios	The patient is aged 30 years	
	The patient is aged 50 years	
	The patient is aged 70 years	
Scenario 4	Maxillary complete dentition and mandibular SDA with missing molars and premolars	3-3
Sub-scenarios	The patient is aged 30 years	
	The patient is aged 50 years	
	The patient is aged 70 years	

SDA: Shortened dental arch, 6: First molar, 5: Second premolar, 4: First premolar, 3: Canine

The collected data were analyzed using the SPSS statistical package (IBM SPSS Statistics for Windows, Version 20.0, Released 2011, IBM Corp, Armonk, New York, USA).

The utility scores for each SDA scenario were obtained by calculating a simple mean for the participant group of dentists as a whole. Paired samples *t*-tests were used to examine whether there were differences in dentists' mean utility values among the different SDA scenarios. Bonferroni's correction was applied to account for multiple comparisons and to set the significance level for each statistical comparison.

RESULTS

With the exception of the authors, all teaching staff with a Bachelor Degree in Dentistry or equivalent were invited to take part (No = 133). Totally, 104 teaching staffs approved to complete the study form, and 29 teaching staff declined participation. The final response rate was therefore 78%.

The mean age of participants was 32 years with a range between 25 and 46 years of age. The number of male dentists was equal to female dentists (52/52). Almost half of participants were holding a Master Degree in one of the dental specialties (48%). Approximately 40% were holding only a Bachelor Degree in Dentistry, 6% were holding a Postgraduate Diploma beside the basic dental degree and a minority had a PhD qualification in dentistry (4%). Year of graduation from the basic dental program ranged between 1989 and 2012. Mean years of work experience following graduation was 8 years.

The average utility value of the RPD among the described SDA scenarios was 0.49 ± 0.15 (standard deviation [SD]). Across the 12 SDA scenarios, the mean utility scores of the RPD ranged between 0.35 and 0.61. The mean utility values attached by dentists to the RPD in each SDA scenario are illustrated in Table 2.

It can be noted from Table 2 that dentists' utility of the partial denture increased with the decrease in the length of the SDA. In order to examine the

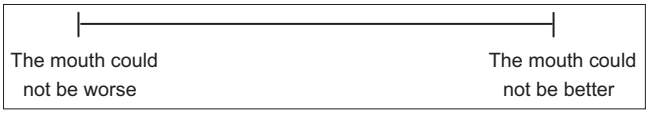

Figure 1: The visual analogue scale

null hypothesis of no significant differences in the mean utility values assigned by dentists to RPDs that restored SDAs of varying length, the *t*-test for paired observation was used. The statistical analysis indicated that the length of the SDA had a significant impact on dentists' utility of the RPD in 13 out of the 18 statistical comparisons [Table 3].

The *t*-test for paired observation was also used to test the null hypothesis of no significant differences in the mean utility values assigned by dentists to RPDs that restored SDAs for patients of different ages. Table 4 shows that patient age had almost no impact on dentists' utility of the RPD for the SDAs.

DISCUSSION

Understanding treatment preferences of health care providers can be considered a cornerstone to achieve the aim of tailoring appropriate treatment decisions. In addition, efficient allocation of health care budgets requires clear insight on the attitudes of those who deliver the treatment.

The sample used in this study was based on subjects holding a degree in dentistry and working as staff members at a private dental college in Saudi Arabia. Staff members of this college are academic people graduated from different dental schools across the Arabic world and Middle East. However, the current study was not designed to evaluate the impact of the country of graduation, academic background or level of clinical experience on treatment preferences. The surveyed sample is relatively small, and the findings of this research may only reflect attitudes of this group of dentists.

This investigation implemented a utility method to elicit dentists' preferences for the RPD in patients with SDAs. The utility concept is "a well-defined concept based on a solid body of theory and a set of compelling axioms."[30] Although the utility measurements have been widely discussed and used in medical research, the popularity of the utility methods is still limited in dentistry. So far, only few authors adopted the utility methods in dental research.[31-38]

Of the different utility methods reported in the literature, the VAS was chosen in this investigation. This type of rating scale has been shown to have good intrarater and interrater reliability (r = 0.70–0.94, r = 0.75–0.77 respectively). Test–retest reliability is also greater for rating scales than for other methods of utility measurement, such as standard gambles or time trade-offs.[27,39] For this reason and because the rating scale is simpler and easier to understand by most people compared to other utility scales,[40] the rating scale was chosen as a utility measurement method in this study.

The results of this study show that participant dentists place a relatively little value on the option of extending the mandibular SDAs by cobalt-chromium RPDs (average utility value = 0.49, SD = 0.15). This result is almost identical with that reported by Ikebe *et al*.[41] among dentists in the Department of Prosthodontics and Oral Rehabilitation at Osaka University Dental Clinic (mean utility value of the

Table 2: Dentists' mean utility values of the partial denture for the mandibular SDAs

Patient's age	Length of the SDA Mean (SD)			
	6-6	5-5	4-4	3-3
30 years old	0.35 (0.33)	0.46 (0.30)	0.56 (0.28)	0.59 (0.34)
50 years old	0.35 (0.29)	0.47 (0.24)	0.60 (0.24)	0.61 (0.32)
70 years old	0.38 (0.33)	0.48 (0.29)	0.58 (0.33)	0.49 (0.38)

Utility values are within the range 0-1, where 0. 0=Total lack of oral health and 1.0=Total oral health. SDA: Shortened dental arch, SD: Standard deviation, 6: First molar, 5: Second premolar, 4: First premolar, 3: Canine

Table 3: *P* values of *t*-test for paired observations to examine the differences in mean utility values assigned by dentists to partial dentures restored mandibular SDAs of varying length

Length of the SDA	Patient's age		
	30 years old	50 years old	70 years old
(6-6) Versus (5-5)	<0.001*	<0.001*	0.004*
(6-6) Versus (4-4)	<0.001*	<0.001*	<0.001*
(6-6) Versus (3-3)	<0.001*	<0.001*	0.035
(5-5) Versus (4-4)	0.002*	<0.001*	<0.001*
(5-5) Versus (3-3)	0.006*	0.001*	0.805
(4-4) Versus (3-3)	0.320	0.908	0.008

Significance level P<0.05/6=0.008 (Bonferroni correction). *Significant difference. SDA: Shortened dental arch, 6: First molar, 5: Second premolar, 4: First premolar, 3: Canine

Table 4: *P* values of *t*-test for paired observations to examine the differences in mean utility values assigned by dentists to partial dentures restored mandibular SDAs for patients of different ages

Patient's age	Length of the SDA			
	6-6	5-5	4-4	3-3
30 Versus 50	0.777	0.643	0.037	0.566
30 Versus 70	0.334	0.751	0.475	0.020
50 Versus 70	0.238	0.967	0.356	<0.001*

Significance level P<0.05/3=0.017 (Bonferroni correction). *Significant difference. SDA: Shortened dental arch, 6: First molar, 5: Second premolar, 4: First premolar, 3: Canine

metal RPD that restored a mandibular SDA with missing molar teeth was 48.6). In addition, attitudes of dentists in our study are in line with attitudes of partially edentulous British patients who attached a low utility value for the cobalt-chromium RPD as a treatment option for the SDA (0.42, SD = 0.3).[34]

In this study, the length of the SDA had a significant impact on dentists' preferences for the RPD. The utility value of the RPD increased with increase in the number of missing posterior teeth that is, the shorter the SDA, the higher was dentists' preference for the RPD.

The scenarios for the extremely SDAs that is, SDAs with missing molar and premolar teeth, attracted the highest utility values for the RPD. Clinical research shows that RPDs that were used to restore the extremely SDAs had a positive impact on masticatory function.[12,13,42] Attitudes of the surveyed dentists may reflect their appreciation of such clinical benefit for the RPD when it is used to restore the extremely SDAs.

Age of patient may have a significant impact on the prognosis of treatment with removable dentures. Younger patients were reported to be more reluctant than older patients to wear removable dentures.[34,41] On the other hand, older patients may have poorer oral conditions and might lack the neuromuscular control to manage removable dentures.[43,44] Our study shows that age of the patient had no effect on dentists' preferences for the RPD that restore the SDAs.

By taking into account the impact of cross-cultural variations and professional characteristics on making treatment decisions,[45,46] further work among other cohorts of dentists from different cultural and professional backgrounds is recommended to confirm the findings of this investigation.

CONCLUSION

The results of this investigation show that restoration of the mandibular SDAs by RPDs is not a highly preferred treatment option among the surveyed group of dentists. Length of the SDA affected dentists' preferences for the RPD, but patient age had no evident impact on dentists' treatment preferences.

REFERENCES

1. Kleinman ER, Harper PR, Gallagher JE. Trends in NHS primary dental care for older people in England: Implications for the future. Gerodontology 2009;26:193-201.
2. White DA, Tsakos G, Pitts NB, Fuller E, Douglas GV, Murray JJ, *et al.* Adult Dental Health Survey 2009: Common oral health conditions and their impact on the population. Br Dent J 2012;213:567-72.
3. Watt RG, Steele JG, Treasure ET, White DA, Pitts NB, Murray JJ. Adult Dental Health Survey 2009: Implications of findings for clinical practice and oral health policy. Br Dent J 2013;214:71-5.
4. Kayser AF. Shortened dental arch: A therapeutic concept in reduced dentitions and certain high-risk groups. Int J Periodontics Restorative Dent 1989;9:426-49.
5. Halse A, Molven O, Riordan PJ. Number of teeth and tooth loss of former dental school patients. Follow-up study after 10-17 years. Acta Odontol Scand 1985;43:25-9.
6. Battistuzzi P, Käyser A, Peer P. Tooth loss and remaining occlusion in a Dutch population. J Oral Rehabil 1987;14:541-7.
7. Demirbuga S, Tuncay O, Cantekin K, Cayabatmaz M, Dincer AN, Kilinc HI, *et al.* Frequency and distribution of early tooth loss and endodontic treatment needs of permanent first molars in a Turkish pediatric population. Eur J Dent 2013;7 Suppl 1:S99-104.
8. Käyser AF. Shortened dental arches and oral function. J Oral Rehabil 1981;8:457-62.
9. Devlin H. Replacement of missing molar teeth – A prosthodontic dilemma. Br Dent J 1994;176:31-3.
10. Nassani MZ, Devlin H, Tarakji B, McCord JF. A survey of dentists' practice in the restoration of the shortened dental arch. Med Oral Patol Oral Cir Bucal 2010;15:e85-9.
11. Käyser AF, Witter DJ, Spanauf AJ. Overtreatment with removable partial dentures in shortened dental arches. Aust Dent J 1987;32:178-82.
12. Witter DJ, van Elteren P, Käyser AF, van Rossum MJ. The effect of removable partial dentures on the oral function in shortened dental arches. J Oral Rehabil 1989;16:27-33.
13. Witter DJ, Van Elteren P, Käyser AF, Van Rossum GM. Oral comfort in shortened dental arches. J Oral Rehabil 1990;17:137-43.
14. Witter DJ, de Haan AF, Käyser AF, van Rossum GM. A 6-year follow-up study of oral function in shortened dental arches. Part I: Occlusal stability. J Oral Rehabil 1994;21:113-25.
15. Witter DJ, De Haan AF, Käyser AF, Van Rossum GM. A 6-year follow-up study of oral function in shortened dental arches. Part II: Craniomandibular dysfunction and oral comfort. J Oral Rehabil 1994;21:353-66.
16. Armellini DB, Heydecke G, Witter DJ, Creugers NH. Effect of removable partial dentures on oral health-related quality of life in subjects with shortened dental arches: A 2-center cross-sectional study. Int J Prosthodont 2008;21:524-30.
17. Aras K, Hasanreisoglu U, Shinogaya T. Masticatory performance, maximum occlusal force, and occlusal contact area in patients with bilaterally missing molars and distal extension removable partial dentures. Int J Prosthodont 2009;22:204-9.
18. Nassani MZ, Tarakji B, Baroudi K, Sakka S. Reappraisal of the removable partial denture as a treatment option for the shortened dental arch. Eur J Dent 2013;7:251-6.
19. Kanno T, Carlsson GE. A review of the shortened dental arch concept focusing on the work by the Käyser/Nijmegen group. J Oral Rehabil 2006;33:850-62.
20. Wolfart S, Marré B, Wöstmann B, Kern M, Mundt T, Luthardt RG, *et al.* The randomized shortened dental arch study: 5-year maintenance. J Dent Res 2012;91 7 Suppl: 65S-71.
21. McKenna G, Allen PF, O'Mahony D, Flynn A, Cronin M, DaMata C, *et al.* Comparison of functionally orientated tooth replacement and removable partial dentures on the nutritional status of partially dentate older patients: a randomised controlled clinical trial. J Dent 2014;42:653-9.
22. Jepson NJ, Moynihan PJ, Kelly PJ, Watson GW, Thomason JM. Caries incidence following restoration of shortened lower dental arches in a randomized controlled trial. Br Dent J 2001;191:140-4.
23. Jepson N, Allen F, Moynihan P, Kelly P, Thomason M. Patient satisfaction following restoration of shortened mandibular dental arches in a randomized controlled trial. Int J Prosthodont 2003;16:409-14.
24. Rohlin M, Mileman PA. Decision analysis in dentistry – The last 30 years. J Dent 2000;28:453-68.
25. Torrance GW. Measurement of health state utilities for economic appraisal. J Health Econ 1986;5:1-30.
26. O'Brien B, Viramontes JL. Willingness to pay: A valid and reliable measure of health state preference? Med Decis Making 1994;14:289-97.
27. Froberg DG, Kane RL. Methodology for measuring health-state preferences – II: Scaling methods. J Clin Epidemiol 1989;42:459-71.

28. Matthews DC, Gafni A, Birch S. Preference based measurements in dentistry: A review of the literature and recommendations for research. Community Dent Health 1999;16:5-11.
29. Petitti DB. Meta-Analysis, Decision Analysis, and Cost-Effectiveness Analysis. Methods for Quantitative Synthesis in Medicine. 2nd ed. New York: Oxford University Press; 2000. p. 169-11.
30. Torrance GW. Utility approach to measuring health-related quality of life. J Chronic Dis 1987;40:593-603.
31. Fyffe HE, Kay EJ. Assessment of dental health state utilities. Community Dent Oral Epidemiol 1992;20:269-73.
32. Brickley M, Armstrong R, Shepherd J, Kay E. The relevance of health state utilities to lower third molar surgery. Int Dent J 1995;45:124-8.
33. Cunningham SJ, Hunt NP. A comparison of health state utilities for dentofacial deformity as derived from patients and members of the general public. Eur J Orthod 2000;22:335-42.
34. Nassani MZ, Devlin H, McCord JF, Kay EJ. The shortened dental arch – An assessment of patients' dental health state utility values. Int Dent J 2005;55:307-12.
35. Nassani MZ, Locker D, Elmesallati AA, Devlin H, Mohammadi TM, Hajizamani A, *et al.* Dental health state utility values associated with tooth loss in two contrasting cultures. J Oral Rehabil 2009;36:601-9.
36. Ikebe K, Hazeyama T, Kagawa R, Matsuda K, Maeda Y. Subjective values of different treatments for missing molars in older Japanese. J Oral Rehabil 2010;37:892-9.
37. Nassani MZ, Kay EJ. Tooth loss – An assessment of dental health state utility values. Community Dent Oral Epidemiol 2011;39:53-60.
38. Kay EJ, Nassani MZ, Aswad M, Abdelkader RS, Tarakji B. The disutility of tooth loss: a comparison of patient and professional values. J Public Health Dent 2014;74:89-92.
39. Fyffe HE, Deery C, Nugent Z, Nuttall NM, Pitts NB. The reliability of two methods of utility assessment in dentistry. Community Dent Health 1999;16:72-9.
40. Stiggelbout AM, Eijkemans MJ, Kiebert GM, Kievit J, Leer JW, De Haes HJ. The 'utility' of the visual analogue scale in medical decision making and technology assessment. Is it an alternative to the time trade-off? Int J Technol Assess Health Care 1996;12:291-8.
41. Ikebe K, Hazeyama T, Ogawa T, Kagawa R, Matsuda K, Wada M, *et al.* Subjective values of different age groups in Japan regarding treatment for missing molars. Gerodontology 2011;28:192-6.
42. Arce-Tumbay J, Sanchez-Ayala A, Sotto-Maior BS, Senna PM, Campanha NH. Mastication in subjects with extremely shortened dental arches rehabilitated with removable partial dentures. Int J Prosthodont 2011;24:517-9.
43. Burt BA. Epidemiology of dental diseases in the elderly. Clin Geriatr Med 1992;8:447-59.
44. Masoro EJ. Physiology of aging. Int J Sport Nutr Exerc Metab 2001;11 Suppl: S218-22.
45. Strauss RP. Culture, dental professionals and oral health values in multicultural societies: Measuring cultural factors in geriatric oral health research and education. Gerodontology 1996;13:82-9.
46. Bartley EJ, Boissoneault J, Vargovich AM, Wandner LD, Hirsh AT, Lok BC, *et al.* The influence of health care professional characteristics on pain management decisions. Pain Med 2015;16:99-111.

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