

Impact of prosthodontic rehabilitation on the masticatory performance of partially dentate older patients: Can it predict nutritional state? Results from a RCT

SM Wallace¹, G McKenna¹ and M Schimmel^{2,3}

¹Centre of Excellence for Public Health, School of Medicine, Dentistry and Biomedical Sciences, Queen's University Belfast, Belfast, BT12 6BJ,

²Division of Gerodontology, University of Bern, Bern, Switzerland and

³Division of Gerodontology and Removable Prosthodontics, University of Geneva, Geneva, Switzerland

As natural teeth are lost, this can impact significantly on patients' oral function⁽¹⁾. With a decreased number of teeth, a reduction in chewing function can result in modifications to food choices and subsequently nutritional state^(2,3).

This study compared two tooth replacement strategies for partially dentate older patients; removable partial dental prostheses (RPDPs) and functionally orientated treatment based on the shortened dental arch (SDA) concept⁽⁴⁾, in regard to masticatory performance and impact on nutritional state.

Patients aged 65 years and older were randomly allocated to two different treatment groups. For the RPDP-group each participant was restored to complete arches with cobalt-chromium RPDPs to replace missing teeth. For the SDA group, participants were restored to a premolar occlusion of 10 occluding pairs of natural and replacement teeth (OU) using bridgework. Masticatory performance was assessed with a previously validated colour-mixing ability (bolus-kneading) test. Each patient provided haematological samples that were screened for biochemical markers of nutritional status. Each sample was tested for serum Albumin, serum Cholesterol, Ferritin, Folate, Vitamin B12 and Vitamin D. Statistical analysis comprised t-tests and mixed-effect regression models.

Eighty-nine patients completed the test for masticatory performance and provided blood samples at baseline and after 12 months. Masticatory performance (VOH) increased significantly in both groups ($p < 0.0001$ obtained from one sample t test), but as shown in the table were not different from each other ($p = 0.169$ obtained from independent sample t test), although OU was higher in the RPDP-group ($p < 0.0001$ obtained from independent sample t test). The statistical models failed to predict nutritional markers from the masticatory performance ($p > 0.05$ obtained from regression analysis).

	Conventional RPDP group	Functional SDA group
Number of participants (n = 89)	44	45
Change in VOH		
Mean	-0.16673	-0.24144
Standard Deviation	0.257845	0.249590
<i>p</i>	0.169	
Standard Error	0.053808	
Lower Confidence Limit	-0.03224	
Upper Confidence Limit	0.181666	

P Value obtained from an independent sample t test

These results indicate that prosthodontic rehabilitation according to the principles of the SDA is equivalent to RPDPs in terms of restoration of chewing capacity for partially dentate older patients. Enhanced masticatory performance alone does not signify improved nutritional state.

1. Brodeur JM, Laurin D, Vallee R, L.D. (1993) *The Journal of Prosthetic Dentistry* **70**, 468–473.
2. Sheiham A & Steele J. (1999) *Gerodontology* **16**, 11–20.
3. Joshipura KJ, Rimm EB, Douglass CW, *et al.* (1996) *Journal of dental research* **75**, 1631–1636.
4. Kayser AF. (1981) *Journal of Oral Rehabilitation* **8**, 457–462.