Abstract: Nutrition may be important in the prevention and control of chronic adult periodontitis. The role of adequate consumption of fruits, vegetables and whole grains in dietary antioxidants in chronic periodontitis has not been thoroughly investigated. The main aim of this dietary intervention study was to assess the influence of customized dietary intervention (aiming to increase the consumption of fruits, vegetable and whole grains) on antioxidant status in adults with chronic periodontitis. In this study, 51 subjects aged 30 – 65 years old, were recruited from Newcastle Dental Hospital in the UK between 2007 and 2008 and were randomly allocated to intervention and control groups. Both groups received normal clinical treatment but, customized dietary advice was delivered to the intervention group by a community nutrition assistant. Dietary intakes, anthropometric parameters, biochemical indices, inflammatory markers in biological fluids (blood and saliva) and periodontal indices, were evaluated at baseline, 3 and 6 months post-dietary intervention. At 3 and 6 months post intervention, the intervention group showed a significant (P<0.05) increase in plasma total antioxidant capacity (TAC) (measured by Trolox equivalent antioxidant capacity assay, TEAC) compared with the control group. At 3 and 6 months following dietary intervention, the intervention group had significantly higher intakes of fruits and vegetables compared with the control group. The intake of whole grain was significantly higher in the intervention group than in the control, 6 months post intervention. No significant differences were observed in periodontal indices and inflammatory markers between groups. High consumption of antioxidant rich foods followed by improving dietary habits may improve antioxidant status in patients with chronic periodontitis, however the impact on periodontal indices and inflammatory markers needs further investigation. It is suggested that dietary advice may help to improve dietary habits and consequently the antioxidant status of patients with chronic periodontitis.