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# Nutritional-Blood-Markers And Dental Status

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## Introduction

It is well documented that the selection of nutritional items is decisively influenced by the dental status. However, there is only little information whether this is also reflected in the individual nutritional status and consequently in typical nutritional-blood-markers.

## Objectives

Hence it was the aim of this clinical study to analyse potential correlations between the dental status and three nutritional-blood-markers in elderly patients. The following null hypothesis was tested: The dental status does not affect the blood-markers a) folate, b) albumin and c) cobalamin.

## Material and Methods

In eighty patients (Department of Geriatrics, Bonifatius Hospital Lingen/Ems, Germany; minimum age 60 years) the following parameters were investigated: The blood-markers folate, albumin and cobalamin, the dental status (score 1: no treatment necessary to 4: treatment obligatory) and the Mini Nutritional Assessment® (MNA®, score 0: normal nutritional status, 1: at risk of malnutrition, 2: malnourished). Additionally a masticatory function test (comminution of a carrot slice, diameter 2cm and height 1cm, chewing time 45s, score 1: excellent comminution to 6: comminution impossible, Fig. 1) was carried out. For statistical analysis (SPSS 17.0) of normally distributed data Oneway Anova was used; otherwise a Kruskal-Wallis H-test was applied. Furthermore a Spearman regression for the dental status and the masticatory function test was calculated.

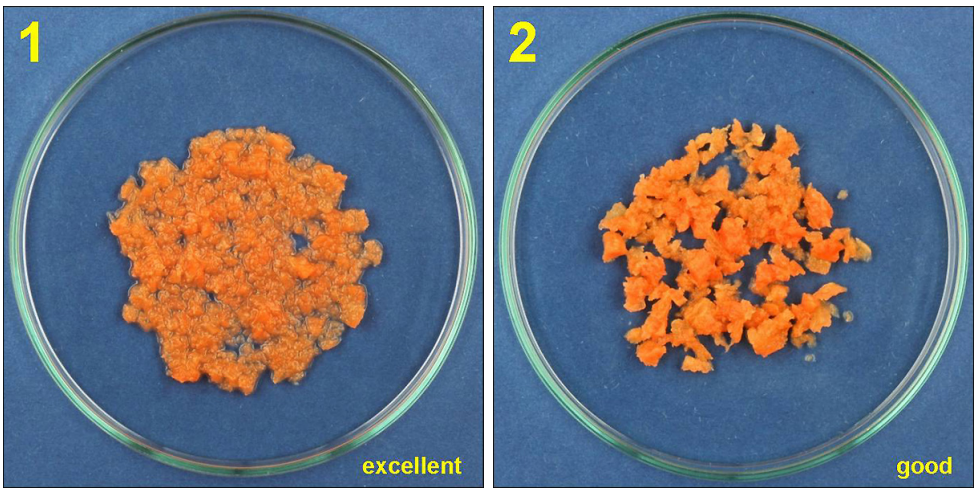


Fig. 1a-b: Masticatory function test (comminution scores)

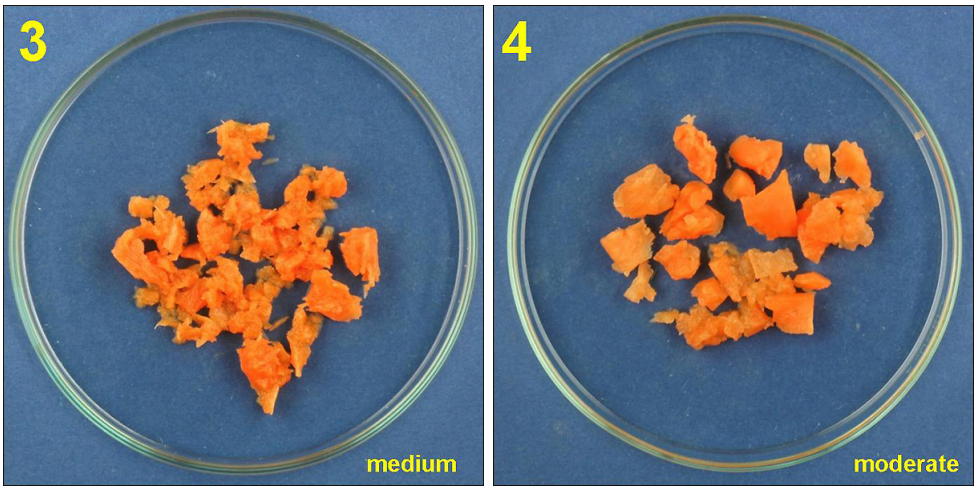


Fig. 1c-d: Masticatory function test (comminution scores)

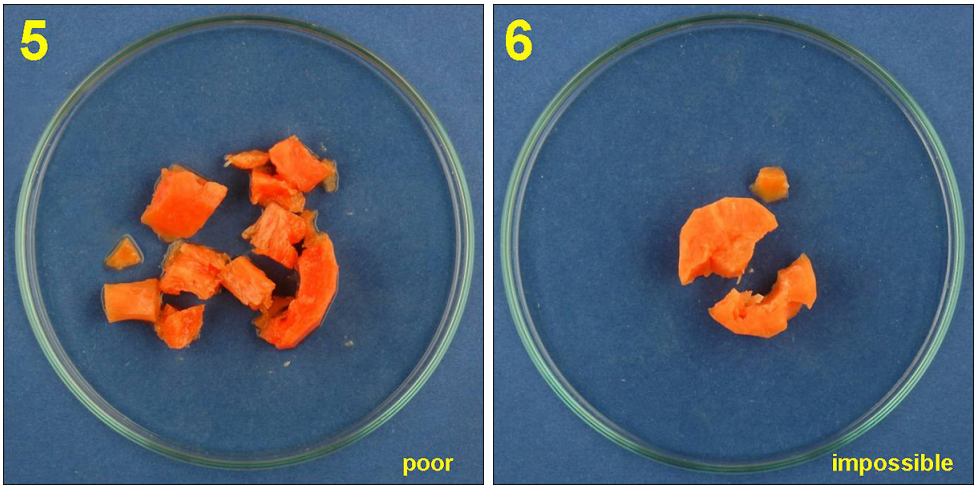


Fig. 1e-f: Masticatory function test (comminution scores)

## Results

The mean score (Mean ± StD) for the dental status was 3.0 ± 0.8 and 0.8 ± 0.6 for the MNA® (Tab. 1). A significant correlation (Spearman, $p < 0.05$) between dental status and the masticatory function test (3.8 ± 1.6) (Fig. 2) as well as albumin could be observed. However, there was no correlation between dental status and the MNA®, folate (7.0 ± 3.7 ng/ml) or cobalamin (394.9 ± 270.9 pg/ml). Thus only part b of the null hypothesis could be rejected.

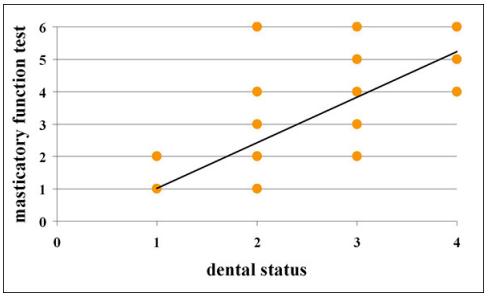


Fig. 2: Dental status and masticatory function test. The line represents the Spearman regression

| dental status | masticatory function test | MNA® | albumin [g/dl] | folate [ng/ml] | cobalamin [pg/ml] |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **standard values** | | | 2.9-4.5 | 4.6-18.7 | 197-866 |
| **1** | 1.5±0.7 | 0±0 | 2.5±1.0 | 5.2±1.1 | 354.6±9.3 |
| **2** | 2.5±1.2 | 0.7±0.5 | 3.5±0.4 | 7.2±4.2 | 412.1±342.7 |
| **3** | 3.6±1.2 | 0.8±0.6 | 3.3±0.5 | 7.4±3.7 | 421.8±279.4 |
| **4** | 5.5±0.7 | 1.0±0.5 | 3.2±0.4 | 6.5±3.6 | 340.0±186.2 |
| **overall** | 3.8±1.6 | 0.8±0.6 | 3.3±0.5 | 7.0±3.7 | 394.9±270.9 |

Tab. 1: Dental status, masticatory function test, MNA and blood-markers (Mean ± StD)

## Conclusions

As multimorbidity and thus multimedication is typical for elderly people our data may be influenced otherwise. Though patients with known problems in their reported history concerning multimedication were excluded from the study, probably some were not aware of their medical status and did not fully report.
Since all folate and cobalamin mean values are within the normal range and all albumin mean values (except the dental status) are also within the normal range regardless of the dental status no general correlation between dental status and blood-markers could be identified.

## Literature


1. Sahyoun NR, Lin CL, Krall E. Nutritional status of the older adult is associated with dentition status. J Am Diet Assoc 2003; 103:61-66.
2. Mobley C, Dounis G. Evaluating dietary intake in dental practices: doing it right. J Am Dent Assoc 2010; 141:1236-1241.
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5. Vellas B, Villars H, Abellan G, et al. Overview of MNA® - Its History and Challenges. J Nut Health Aging 2006; 10: 456-465.
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*This Poster was submitted by Dr. Martha Zenginel.*


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**Poster Faksimile:**

# Nutritional-Blood-Markers And Dental Status

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## 1 Objectives

It is well documented that the selection of nutritional items is decisively influenced by the dental status[1,2,3,4]. However, there is only little information whether this is also reflected in the individual nutritional status and consequently in typical nutritional-blood-markers. Hence it was the aim of this clinical study to analyse potential correlations between the dental status and three nutritional-blood-markers in elderly patients. The following null hypothesis was tested: The dental status does not affect the blood-markers a) folate, b) albumin and c) cobalamin.

## 2 Materials & Method

In eighty patients (Department of Geriatrics, Bonifatius Hospital Lingen/Ems, Germany; minimum age 60 years) the following parameters were investigated: The blood-markers folate, albumin and cobalamin, the dental status (score 1: no treatment necessary to 4: treatment obligatory) and the Mini Nutritional Assessment® (MNA®[5,6,7], score 0: normal nutritional status, 1: at risk of malnutrition, 2: malnourished). Additionally a masticatory function test (comminution of a carrot slice, diameter 2cm and height 1cm, chewing time 45s, score 1: excellent comminution to 6: comminution impossible, Fig. 1) was carried out. For statistical analysis (SPSS 17.0) of normally distributed data Oneway Anova was used; otherwise a Kruskal-Wallis H-test was applied. Furthermore a Spearman regression for the dental status and the masticatory function test was calculated.

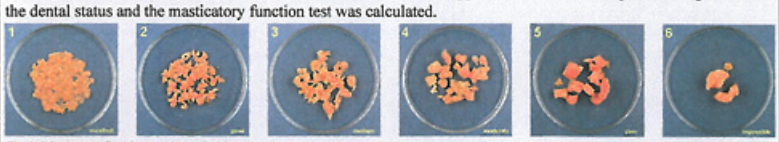


Fig. 1: Masticatory function test (comminution scores)

## 3 Results

The mean score (Mean ± StD) for the dental status was 3.0 ± 0.8 and 0.8 ± 0.6 for the MNA® (Fig. 2). A significant correlation (Spearman, $p < 0.05$) between dental status and the masticatory function test (3.8 ± 1.6) (Fig. 3) as well as albumin could be observed. However, there was no correlation between dental status and the MNA®, folate (7.0 ± 3.7 ng/ml) or cobalamin (394.9 ± 270.9 pg/ml). Thus only part b of the null hypothesis could be rejected.

| dental status | masticatory function test | MNA® | albumin [g/dl] | folate [ng/ml] | cobalamin [pg/ml] |
|---|---|---|---|---|---|
| standard values | | | 2.9 - 4.5 | 4.6 - 18.7 | 197 - 866 |
| 1 | 1.5 ± 0.7 | 0 ± 0 | 2.5 ± 1.0 | 5.2 ± 1.1 | 354.6 ± 9.3 |
| 2 | 2.5 ± 1.2 | 0.7 ± 0.5 | 3.5 ± 0.4 | 7.2 ± 4.2 | 412.1 ± 342.7 |
| 3 | 3.6 ± 1.2 | 0.8 ± 0.6 | 3.3 ± 0.5 | 7.4 ± 3.7 | 421.8 ± 279.4 |
| 4 | 5.5 ± 0.7 | 1.0 ± 0.5 | 3.2 ± 0.4 | 6.5 ± 3.6 | 340.0 ± 186.2 |
| overall | 3.8 ± 1.6 | 0.8 ± 0.6 | 3.3 ± 0.5 | 7.0 ± 3.7 | 394.9 ± 270.9 |

Fig. 2: Dental status, masticatory function test, MNA® and blood-markers (Mean ± StD)

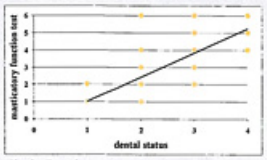


Fig. 3: Dental status and masticatory function test. The line represents the Spearman regression.

## 4 Discussion & Conclusion

As multimorbidity and thus multimedication is typical for elderly people our data may be influenced otherwise. Though patients with known problems in their reported history concerning multimedication were excluded from the study, probably some were not aware of their medical status and did not fully report.

Since all folate and cobalamin mean values are within the normal range and all albumin mean values (except the dental status 1) are also within the normal range regardless of the dental status no general correlation between dental status and blood-markers could be identified.

However, within the limitations of the study it can be concluded that the dental status in elderly patients reflects itself in one of the tested nutritional-blood-markers. Nevertheless, the question whether the only independent variable is the dental status or which role other variables (e.g. the socioeconomic status[8]) play, remains open.

## 5 References

1. Sahyoun NR, Lin CL, Krall E. Nutritional status of the older adult is associated with dentition status. J Am Diet Assoc 2003; 103:61-66.
2. Mobley C, Dounis G. Evaluating dietary intake in dental practices: doing it right. J Am Dent Assoc 2010; 141:1236-1241.
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8. Musacchio E, Perissinotto E, Binotto P, et al. Tooth loss in the elderly and its association with nutritional status, socio-economic and lifestyle factors. Acta Odontol Scand 2007; 65: 78-86.

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