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ALVEOLAR BONE LOSS IN DENTURE WEARERS AS RELATED TO FACIAL MORPHOLOGY

by

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INTRODUCTION

Individual variation in alveolar bone loss during long-term use of complete dentures is an important problem, which remains unsolved. The few longitudinal studies reported on this subject have not revealed any major factor responsible for this variation. Moreover, the difference in response of the maxillary and mandibular alveolar processes to the wearing of dentures has not been subjected to close analysis.

As reported in previous cephalometric studies covering a 7-year period of complete denture wear (*Tallgren, 1967, 1969*), the mean reduction in anterior height of the edentulous mandibular process was found to be some four times greater than that of the maxillary process. In the posterior segments this difference in resorption was still more marked. However, great individual variation in resorption pattern was observed, and this was also the case in regard to the maxillary resorption in subjects wearing a complete upper and a partial lower free-end denture.

Atwood (1957, 1962), in discussing his observations on the variability in the rate of resorption of the alveolar ridges due to complete denture treatment, suggested that inter- and intrasubject variation in resorption may be attributed to an interrelationship between various anatomical,

metabolic, functional and prosthetic factors. Some factors possibly influencing the resorption were examined by *Wictorin* (1964) and *Carlsson et al.* (1967) in longitudinal cephalometric studies concerning the anterior resorption of the maxillary alveolar process under complete upper dentures, and by *Carlsson* and *Persson* (1967) in a similar study on mandibular resorption. In these studies no significant differences in resorption between different age groups were found. *Wictorin*, during 1 year of observation, noted a greater mean resorption in men than in women. Furthermore, a significant association was observed between maxillary alveolar bone loss and the initial height of the upper alveolar process. On the other hand, the observations over a 5-year period of denture wear reported by *Carlsson* and co-workers revealed no significant differences in resorption between groups divided according to sex or the pre-extraction height or size of the alveolar processes. No significant associations were observed between resorption and the pre-extraction periodontal status, either.

The aim of the present study was to investigate the relationship between facial morphology and anterior bone loss in edentulous alveolar processes during a 7-year period of denture wear. The problem of resorption has not hitherto been approached from this standpoint.

MATERIAL AND METHODS

The present analysis was based on measurements obtained from lateral cephalometric films of 22 Finnish adults, mainly women (*Tallgren*, 1967, 1969). Of these subjects 11 were provided with complete upper and lower dentures (Group A), and 11 with a complete upper denture, the lower jaw being furnished with a partial free-end denture (Group B). The treatment given was of the conventional type, the dentures being constructed 2–3 months after extraction. No pre-extraction records were used in the construction of the dentures. All dentures were provided with porcelain teeth.

Methods of analysis

The cephalometric reference points and lines are shown in Fig. 1. The variables studied are listed in Table I. The measurements of the mandibular shape are shown in Fig. 2 and the measurements of resorption in Fig. 3. All measurements with the exception of the variables 10–14 and 32–37 (cf Table I) were obtained from occlusion films. It should further be noted that the reference points and lines referring to the dentition apply both to the natural dentition and to the artificial teeth of the dentures.

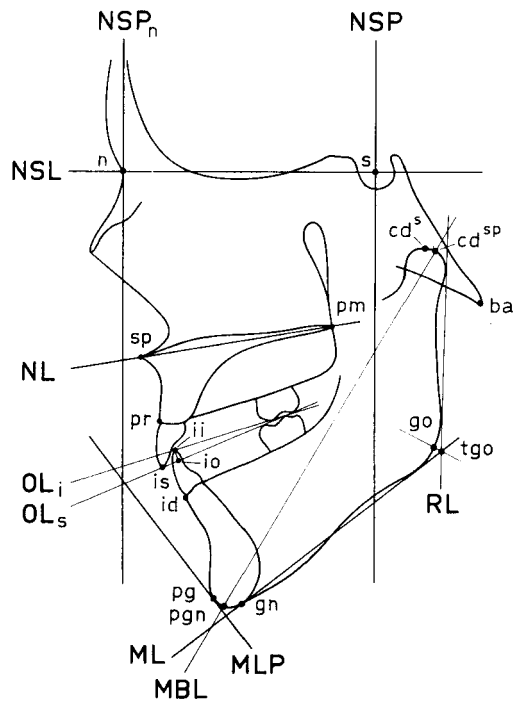


Fig. 1. Reference points and lines on the profile cephalometric films.

Table I
Variables studied

1. n-s	15. id-n-pr	29. ii hor. MLP
2. s-ba	16. n-gn	30. ii-io
3. n-s-ba	17. NSL-ML	31. is-io
4. n-sp	18. NSL-MBL	32. Anterior height of maxillary process ^r
5. s-pm	19. NL-ML	33. Anterior height of mandibular process ^r
6. NSL-NL	20. s-n-pg	34. Anterior linear vertical resorption of maxillary process ^r
7. sp-pm	21. NSL-OLs	35. Anterior linear vertical resorption of mandibular process ^r
8. s-n-sp	22. NSL-OLi	36. Anterior resorption area of maxillary process ^r
9. s-n-pr	23. OLi-ML	37. Anterior resorption area of mandibular process ^r
10. β -angle ^r	24. is vert. NSL	38. Age
11. RL-ML ^r	25. is hor. NSPn	
12. cd ^{sp} -pgn ^r	26. ii vert. NSL	
13. pg-go ^r	27. ii hor. NSPn	
14. cd ^s -go ^r	28. ii vert. ML	

^r Measured on rest position films

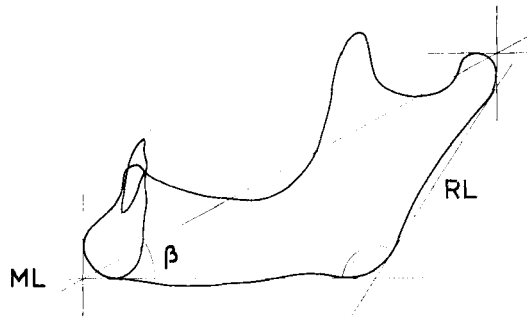


Fig. 2. Measurements of the shape of the mandible in terms of the β -angle (Lindegård, 1953) and the gonial angle (RL—ML).

The analysis comprised the following stages of observation: (a) before extraction, (b) after insertion of the dentures and (c) after 7 years of denture wear. The distributions of the linear and angular variables at the pre-extraction stage and the differences in measurements between the stages of observation have been reported in the above-mentioned publications (Tallgren, 1967, 1969), which also provide a detailed account of definitions of measurements and the statistical analysis of the distributions.

In order to obtain information on the relationship between the pairs of variables, correlation coefficients were calculated by computer according

to the formula $r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$. The 5 and 1 per cent significance limits (* and **) for the correlation coefficients for the present sample

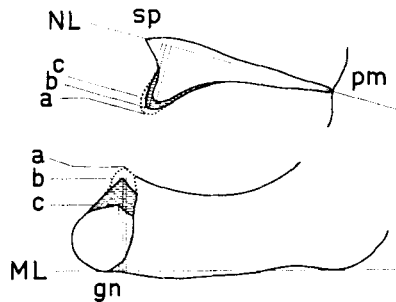


Fig. 3. Measurements of resorption. Anterior height of the maxillary and mandibular alveolar processes (a) before extraction, (b) after insertion of dentures and (c) after 7 years of denture wear. The difference b—c represents the linear vertical resorption during 7 years of denture wear and the shaded area represents the area of resorption.

size were .602 and .735 (*Snedecor*, 1946). A further examination of the two-dimensional distributions was performed graphically and by a two-by-two test based on the hypergeometrical distribution (*Solow & Helm*, 1968).

RESULTS

Correlations between all variables at the different stages of observation were computed and analysed. However, in the following only correlations relating to the problem under investigation will be dealt with. Some correlation coefficients of special interest are shown in Tables II—VII. The more marked associations are illustrated graphically. Owing to the small size of the samples, all correlations were interpreted with great caution.

Characteristics of resorption

In the complete denture group the linear vertical resorption of the maxillary and mandibular alveolar processes was closely associated with the resorption area (maxillary resorption .82**, mandibular resorption .91**, Table II, Fig. 4). A similar association (.80**) was found for the maxillary resorption in the complete upper — partial lower group.

The relationship between the maxillary and mandibular resorption in the complete denture group was characterized by an inverse association (linear —.65*, area —.63*). Pronounced resorption of the mandibular

Table II
Correlations between resorption variables

A. Complete dentures						B. Complete upper — partial lower	
		Mandibular resorption		Maxillary resorption		Maxillary resorption	
		Linear	Area	Linear	Area	Linear	Area
Stage		b—c				b—c	
Mandibular resorption area	b—c	.91**					
Maxillary linear resorption	»	— .65*	— .70*				
Maxillary resorption area	»	— .56	— .63*	.82**		.80**	
Age	a	— .12	.01	— .06	— .07	.17	.14

- a = Before extraction
- b = After insertion of dentures
- c = After 7 years of denture wear

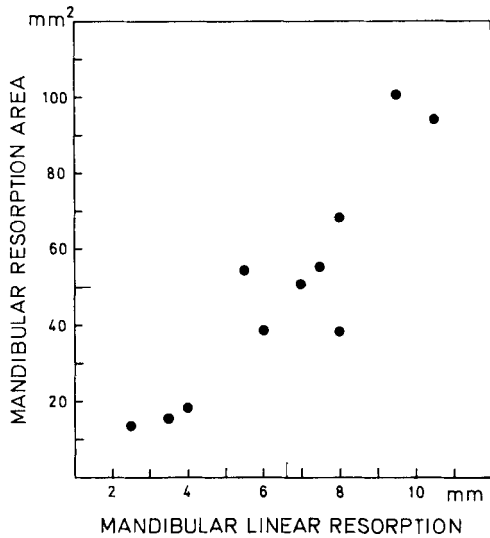


Fig. 4. Complete denture wearers. Diagram illustrating the relationship between the linear vertical resorption and the area of resorption in the anterior segment of the mandibular process during 7 years of denture wear ($r = - .91^{**}$).

process was usually accompanied by small maxillary reduction, while marked maxillary resorption often was associated with small mandibular reduction. This is illustrated in Fig. 5.

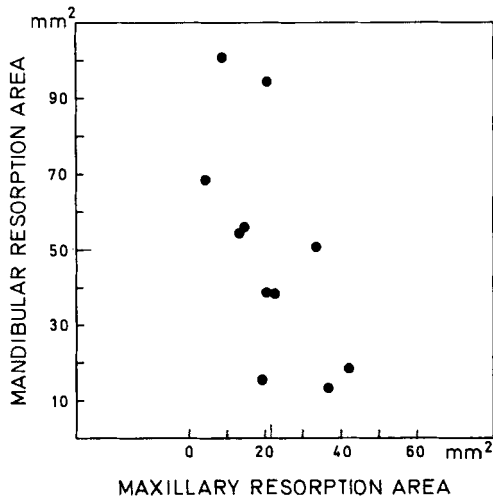


Fig. 5. Complete denture wearers. Diagram illustrating the relationship between the maxillary and mandibular resorption areas during 7 years of denture wear ($r = - .63^{*}$).

No marked associations between resorption and age were observed in either group (Table II).

Correlations with facial morphological characteristics

In the present samples no significant associations were observed between resorption and morphological characteristics of the cranial base or the upper face. On the other hand, in the complete denture group (Table III) the total anterior resorption area of the maxillary and mandibular alveolar processes showed a marked association with the mandibular shape (β -angle .66*; gonial angle, RL—ML —.51, Fig. 6). Similar associations were found for the mandibular resorption area (β -angle .57, RL—ML —.46). The maxillary resorption showed no marked associations with the mandibular shape, whereas positive correlations with the length of the mandible (cd^{sp} — pgn) were observed (linear resorption .69*, area of resorption .60*, Fig. 7).

Table III

Correlations between alveolar resorption during 7 years of denture wear (stage b—c) and facial morphological characteristics at the pre-extraction stage (a)

	A. Complete dentures						B. Complete upper — partial lower	
	Maxillary resorption		Mandibular resorption		Maxillary and mandib. res.		Maxillary resorption	
	Linear	Area	Linear	Area	Linear	Area	Linear	Area
β -angle	— .21	— .08	.31	.57	.28	.66*	.17	.54
RL-ML	.19	.12	— .27	— .46	— .25	— .51	— .23	— .59
cd^{sp} - pgn	.69*	.60*	— .35	— .24	— .10	— .01	— .21	— .31
pg - go	.51	.38	— .24	— .16	— .05	— .02	— .10	.06
cd^{sp} - go	.40	.46	— .14	.09	.02	.33	— .29	— .17
d-n-pr	— .08	— .28	— .07	.04	— .13	— .08	.23	.29
ng-gn	.46	.31	— .37	— .27	— .23	— .19	— .15	— .50
NSL-ML	— .04	— .13	— .07	— .21	— .10	— .33	.02	— .36
NSL-MBL	— .12	— .17	.04	— .06	— .01	— .16	.16	— .13
NL-ML	.10	— .01	— .20	— .34	— .20	— .42	.02	— .35
s-n-pg	.37	.44	— .17	— .10	— .03	.09	— .26	— .18
Ant. height maxillary process	— .21	— .12	.11	.09	.04	.05	.07	— .32
Ant. height mandibular process	.21	.27	.09	— .03	.22	.10	.12	— .31

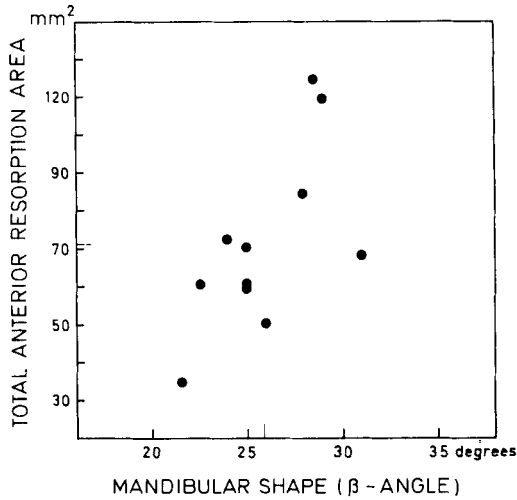


Fig. 6. Complete denture wearers. Diagram illustrating the relationship between the mandibular shape (β -angle) and the total anterior resorption area of the maxillary and mandibular alveolar processes during 7 years of denture wear ($r = .66^*$).

In the complete upper — partial lower group, the resorption of the edentulous maxillary process showed correlations with the mandibular shape, similar to those displayed by the total resorption in the complete denture

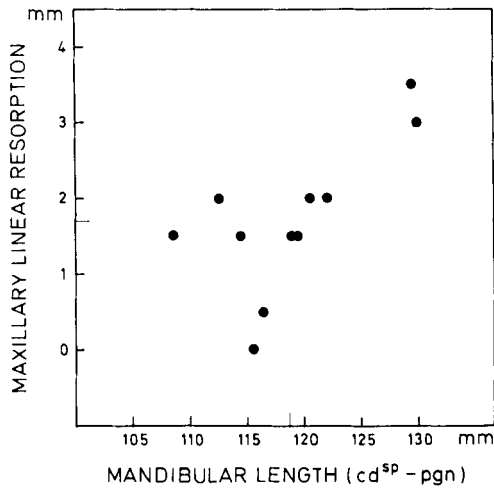


Fig. 7. Complete denture wearers. Diagram illustrating the relationship between mandibular length (cd^{SP}-pgn) and the linear vertical resorption of the maxillary process during 7 years of denture wear ($r = .69^*$).

group (β -angle .54, RL—ML —.59). The graphical examination disclosed, however, that the high level of these correlation coefficients was mainly due to a single observation deviating greatly from the means.

In the present samples the alveolar resorption was not found to be significantly associated with the positional relationship of the mandible to the cranial base at the pre-extraction stage (Table III). Nor were any significant correlations observed between resorption and the initial height of the alveolar processes.

Correlations with initial changes in mandibular position

In the complete denture group, the resorption of the alveolar processes showed no significant associations with the increase in pre-extraction facial height due to insertion of the dentures or with the corresponding increase in mandibular inclination (Table IV). On the other hand, in the complete upper — partial lower group marked correlations were observed between the maxillary resorption area and the increase in mandibular inclination and facial height (increase NSL—MBL .76**, increase NSL—ML .64*, increase n—gn .61*, Fig. 8).

Correlations with dento-basal relationships

No significant associations were found in either group between resorption and the vertical and horizontal relationships of the upper and lower incisal

Table IV

Correlations between alveolar resorption during 7 years of denture wear and changes in mandibular position due to insertion of dentures

		A. Complete dentures						B. Complete upper — partial lower	
		Maxillary resorption		Mandibular resorption		Maxillary and mandib. res.		Maxillary resorption	
		Linear	Area	Linear	Area	Linear	Area	Linear	Area
Stage		b—c						b—c	
n-gn	b—a	.06	.19	.26	.11	.35	.23	.32	.61*
NSL-ML	»	.09	.19	.15	— .04	.23	.05	.34	.64*
NSL-MBL	»	.20	.28	.09	— .09	.21	.03	.44	.76**
NL-ML	»	.04	.16	.23	.08	.31	.17	.34	.56
s-n-pg	»	— .11	— .11	— .12	— .01	— .21	— .06	— .33	— .40

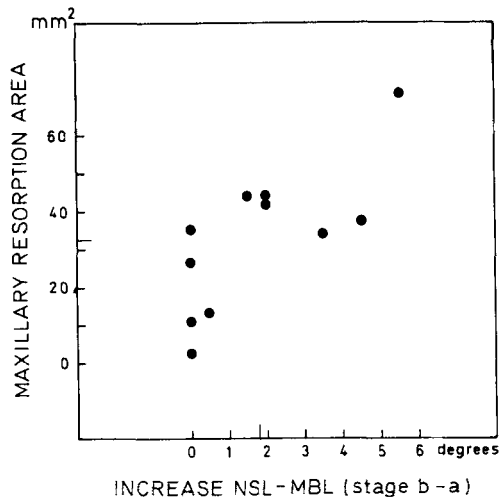


Fig. 8. Complete upper — partial lower dentures. Diagram illustrating the relationship between the increase in mandibular inclination (NSL—MBL) due to the insertion of dentures (stage b—a) and the maxillary resorption area during 7 years of denture wear ($r = .76^{**}$).

edges to the cranial base. On the other hand, in the complete denture group (Table V) marked associations were observed between resorption and the antero-posterior relationship of the lower incisal edges to the mandibular

Table V
Correlations between alveolar resorption during 7 years of denture wear and the positional relationship of the lower incisal edges to the mandibular body

		Complete dentures			
		Maxillary resorption		Mandibular resorption	
		Linear	Area	Linear	Area
Stage		b—c			
ii vert. ML	a	.40	.22	— .14	— .22
	b	.59	.33	— .21	— .33
	b—a	.15	.09	— .07	— .28
ii hor. MLP	a	.70*	.72*	— .69*	— .62*
	b	.64*	.67*	— .49	— .44
	b—a	— .48	— .47	.63*	.57

a₁ = Before extraction
 b = After insertion of dentures
 c = After 7 years of denture wear

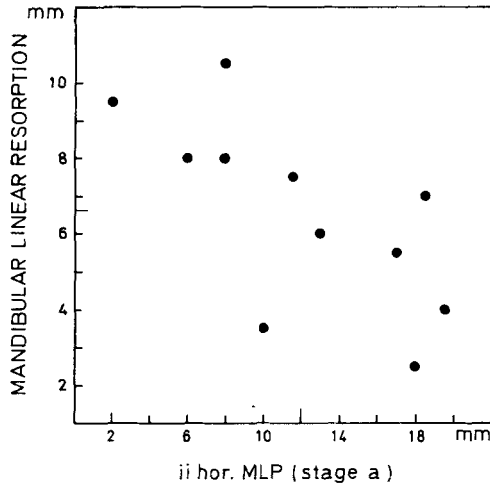


Fig. 9. Complete denture wearers. Diagram illustrating the relationship between the antero-posterior position of the natural lower incisors (*ii hor. MLP*) and the linear vertical resorption of the mandibular process during 7 years of denture wear ($r = -.69^*$). A small value of *ii hor. MLP* indicates a labial position of the lower incisal edges, and a large value indicates a lingual position.

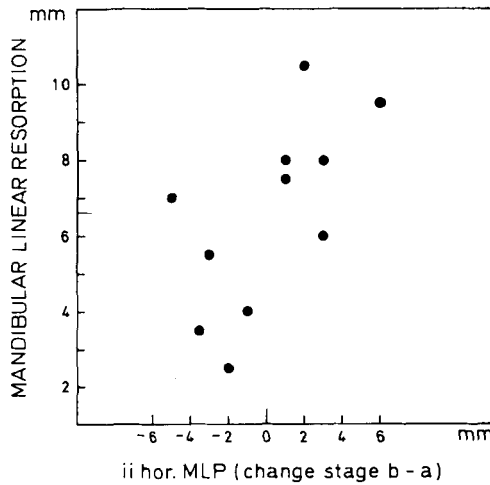


Fig. 10. Complete denture wearers. Diagram illustrating the relationship between the change in position of the lower incisal edges (*ii hor. MLP*) due to the denture construction (stage *b-a*), and the linear vertical resorption of the mandibular process during 7 years of denture wear ($r = .63^*$). Positive values of *ii hor. MLP* indicate a change in the lingual direction of the lower incisal edges and negative values a change in the labial direction.

body (ii hor. MLP). Positive correlations were noted for the maxillary resorption (pre-extr. stage .70*, .72*) and negative correlations for the mandibular resorption (pre-extr. stage $-.69^*$, $-.62^*$). As illustrated in Fig. 9, pronounced resorption of the mandibular process was associated with a labial position of the natural lower incisors (a small ii hor. MLP) and less marked resorption with a lingual position of these teeth (a large ii hor. MLP).

The mandibular resorption was further found to be correlated with the antero-posterior change in position of the lower incisal edges produced in construction of the dentures (linear resorption .63*, resorption area .57). Thus, as illustrated in Fig. 10, a more lingual positioning of the incisal edges of the artificial lower incisors than that of the natural teeth was associated with pronounced mandibular resorption, and a change in the labial direction with less marked resorption. As further illustrated in Fig. 11, such changes in position in the lingual direction of the lower incisal edges were noted, in particular, in subjects with a labial position of the natural lower incisors, and changes in the labial direction in those with a lingual position of these teeth.

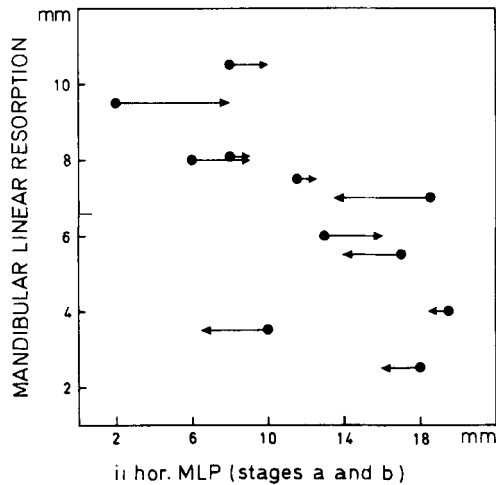


Fig. 11. Complete denture wearers. Diagram illustrating the antero-posterior position of the natural lower incisors (ii hor. MLP) and of the artificial lower incisors at the stage of insertion of the dentures as related to the linear vertical resorption of the mandibular process during 7 years of denture wear. Arrows indicate direction of the change in position of the lower incisal edges between the two stages: in the lingual direction (to the right), in the labial direction (to the left).

No significant associations were observed between resorption and the occlusal plane inclinations at the pre-extraction and post-insertion stages (Table VI). However, in the complete denture group negative correlations were noted between the maxillary resorption and the inclinations of the occlusal planes to the cranial base (NSL—OLs —.56, NSL—OLi —.58). In neither group were any significant associations observed between resorption and overbite or overjet at the pre-extraction and post-insertion stages (Table VI).

DISCUSSION

In the present samples resorption of the alveolar processes was not found to be related to age. This is in accordance with observations in various groups of denture wearers (*Wictorin, 1964; Carlsson et al., 1967; Carlsson & Persson, 1967*) and also with a previous study on reduction in facial height during long-term wearing of dentures (*Tallgren, 1966*).

Table VI
Correlations between alveolar resorption during 7 years of denture wear and dental relationships

		A. Complete dentures				B Complete upper — partial lower	
		Maxillary resorption		Mandibular resorption		Maxillary resorption	
		Linear	Area	Linear	Area	Linear	Area
Stage		b—c				b—c	
NSL-OLs	a	— .44	— .56	.19	.17	.27	.27
	b	— .42	— .49	.25	.26	— .19	.02
NSL-OLi	a	— .50	— .58	.18	.17	— .02	— .12
	b	— .40	— .41	.23	.23	— .14	— .08
OLi-ML	a	.38	.30	— .23	— .40	.09	— .26
	b	.30	.23	— .24	— .45	.22	— .20
ii-io	a	.18	.12	.19	.17	.38	.40
	b	— .17	— .47	.11	.17	.10	.37
is-io	a	— .06	— .13	— .03	.24	.21	.40
	b	— .49	— .49	.28	.36	.28	.43

a = Before extraction

b = After insertion of dentures

c = After 7 years of denture wear

The correlations between resorption and facial morphology observed in the complete group indicated that individual variation in alveolar bone loss bore a certain relationship to morphological characteristics of the mandible. Thus, a tendency towards pronounced resorption, especially of the mandibular alveolar process, was observed in individuals with a marked mandibular base bend (large β -angle, small gonial angle). According to *Lindegård* (1953), *Björk* (1960) and *Solow* (1966), this shape of the mandible is usually seen in individuals with a small inclination of the mandible to the cranial base, a lower occlusal line more or less parallel to the mandibular line (ML), a tendency to mandibular prognathism and, often, a small anterior facial height. Similar associations were also observed in the present samples (Table VII).

This tendency towards pronounced alveolar resorption associated with the shape of the mandible may be related to various factors. One factor to consider is the muscular force. In this connexion electromyographic findings of *Møller* (1966) are of special interest. In young adult individuals he found strong activity in the masseter and the anterior temporal muscles during maximal biting to be related to the above-mentioned mandibular shape, in particular to a small gonial angle. According to *Møller*, the electrical activity in the masseter and the anterior temporal muscles recorded during forced closure in the intercuspal position may serve as a measure of the strength

Table VII

Correlations between mandibular shape and facial morphological characteristics

	Present study		Group B		<i>Solow</i> (1966)*	
	Group A n = 11		Group B n = 11		n = 102	
	β -angle	RL-ML	β -angle	RL-ML	β -angle	RL-ML
RL-ML	-.93**		-.98**		-.85**	
NSL-ML	-.78**	.84**	-.77**	.76**	-.78**	.74**
NSL-MBL	-.60*	.69*	-.43	.42	-.38**	.37**
NL-ML	-.82**	.86**	-.78**	.77**	-.72**	.71**
OLi-ML	-.73*	.77**	-.75**	.72*	-.64**	.67**
s-n-pg	.56	-.66*	-.06	.13	.25**	-.20**
n-gn	-.32	.50	-.66*	.73*	-.32**	.34**
cd ^{8P} -pgn	.22	-.17	-.59	.67*	-.05	.07

* Variables nr. 66 and 65 in *Solow* (1966)

of these muscles. A similar association between the masseter activity in mastication and the size of the gonial angle was observed by *Witt* (1963) and *Ahlgren* (1966).

A greater response of the lower alveolar process than of the upper one to the functional forces applied through the dentures may in part be related to a less favourable size and shape of the denture bearing area. It is reasonable to assume that in the case of a marked mandibular base bend, the especially unfavourable anatomical conditions for a sufficient distal extension of the lower denture base and for an appropriate setting of the artificial teeth may contribute to mandibular resorption. Considering the muscular behaviour in long-term complete denture wearers (*Tallgren*, 1963), it would seem likely that strong activity of the lower lip and mentalis muscles due to impaired retention and stability of the lower denture may further increase the anterior resorption of the mandibular process.

The anterior resorption of the maxillary process in the complete denture group showed no marked association with the mandibular shape, whereas a positive correlation with the length of the mandible was noted. In this connexion, the positive correlation between mandibular length and the activity of the anterior temporal muscle during maximal biting, observed by *Møller* (1966), may be one factor to consider. The direction of force, as determined by the inclination of the maxillary occlusal plane and the positional relationship of the lower incisors to the maxillary process, may also play a part.

In the present samples no significant associations between resorption and the initial height of the alveolar processes were observed. This is in accordance with the findings of *Carlsson et al.* (1967) and *Carlsson and Persson* (1967), but in contrast to the observation reported by *Wictorin* (1964).

In the complete denture group, the resorption of the alveolar processes was further found to be associated with the antero-posterior position of the lower incisal edges in relation to the mandibular body. Thus, a tendency towards pronounced resorption of the mandibular process was observed in subjects with a labial position of the lower incisal edges in the natural dentition (a small *ii hor.* MLP). The variable *ii hor.* MLP may be interpreted as a combined measure of the alveolar prognathism and the incisal inclination of the mandible. Since these two variables were not studied in the present investigation, their relative importance in resorption of the alveolar processes remains to be established.

An association was also observed between mandibular resorption and the antero-posterior change in position of the lower incisal edges resulting from the construction of the dentures. This suggests that a more lingual

positioning of the incisal edges of the artificial lower incisors than that of the natural teeth may contribute to mandibular resorption. Such a lingual setting of the lower denture incisors was noted particularly in those individuals who had had a labial position of the lower incisal edges in the natural dentition. Although a causal relationship between these factors can not be established by the present study, it is reasonable to assume that changes in tongue position may play a part in resorption of the mandibular process.

In the complete upper — partial lower group no close associations between facial morphological characteristics and resorption of the edentulous maxillary process could be shown. Only some trends were observed. In contrast to the findings in the complete denture group, the maxillary alveolar bone loss was found to be associated with an increase in pre-extraction mandibular inclination due to insertion of the dentures. This observation is in accordance with previous findings on the relationship between the increase and reduction in facial height in this category of denture wearers (*Tallgren, 1966*).

In the present analysis of the relationship between alveolar resorption and facial morphological traits, only the more marked correlations have been considered. However, in many instances certain non-significant trends were observed. In order to elucidate further these trends, studies of larger samples are desirable.

The clinical significance of the present findings lies in the possibility of predicting the resorption of the alveolar processes in individuals to be provided with complete upper and lower dentures. The findings suggest that careful examination of facial and especially mandibular morphological characteristics can provide valuable information on the response of the alveolar processes to the wearing of dentures.

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SUMMARY

The relationship between facial morphology and the anterior bone loss in edentulous alveolar processes during a 7-year period of denture wear was studied on lateral cephalometric films of 22 Finnish subjects. Of these subjects 11 were provided with complete upper and lower dentures, and 11 with a complete upper and a partial lower free-end denture. Owing to the limited size of the samples great caution was exerted in the interpretation

of the results. In the following some of the more pronounced associations are summarized.

The correlations between resorption and facial morphology observed in the complete denture group indicated that individual variation in alveolar bone loss bore a certain relationship to morphological characteristics of the mandible. A tendency towards pronounced resorption, especially of the mandibular process, was observed in subjects with a marked mandibular base bend, while less marked resorption was seen in subjects with a flattened mandibular base.

An association was also observed between alveolar resorption and the antero-posterior position of the lower incisal edges in relation to the mandibular body. A tendency towards marked resorption of the mandibular process was observed in subjects with a labial position of the lower incisal edges in the natural dentition.

The observations further indicated that changes in position of the lower incisors due to denture construction may contribute to alveolar resorption. Thus, a more lingual positioning of the incisal edges of the artificial lower incisors than that of the natural teeth was found to be associated with a marked mandibular resorption.

In the complete upper — partial lower group, the resorption of the edentulous maxillary process showed no close associations with facial morphological traits.

No marked associations between resorption and age were found in either group.

The findings suggest that in individuals to be provided with complete upper and lower dentures, careful examination of facial and especially mandibular morphological characteristics can provide valuable information on the response of the alveolar processes to the wearing of dentures.

RÉSUMÉ

RAPPORTS ENTRE LA MORPHOLOGIE FACIALE ET LA RÉSORPTION DE L'OS ALVÉOLAIRE CHEZ LES PORTEURS DE PROTHÈSES

L'auteur a étudié, sur des radiographies céphalométriques du profil de 22 sujets finlandais porteurs de prothèses, les rapports entre la morphologie faciale et la résorption osseuse dans la région antérieure des procès alvéolaires édentés au cours d'une période de 7 années de port des prothèses. Parmi ces sujets, 11 avaient des prothèses complètes haut et bas, et les 11 autres avaient une prothèse complète du haut et une prothèse inférieure partielle

en extension. En raison de l'effectif réduit de l'échantillon, l'interprétation des résultats a été faite avec la plus grande circonspection. Quelques-unes des relations les plus nettes sont résumées ci-dessous.

Les corrélations trouvées dans le groupe des prothèses complètes haut et bas entre la résorption et la morphologie faciale observées indiquaient l'existence d'un rapport particulier entre les variations individuelles dans la résorption de l'os alvéolaire d'une part, et les caractéristiques morphologiques de la mandibule d'autre part. Chez les sujets dont la base mandibulaire présentait une courbure accentuée, on observait une tendance à ce que la résorption fût marquée, particulièrement au niveau du procès alvéolaire mandibulaire, tandis que, chez les sujets dont la base mandibulaire avait un contour moins accusé, la résorption observée était moins marquée.

On constatait aussi une relation entre la résorption alvéolaire et la position antéro-postérieure des bords incisifs inférieurs par rapport au corps de la mandibule. Lorsque, dans la denture naturelle, les bords incisifs inférieurs avaient été situés en position vestibulaire, on observait chez les sujets une tendance à une résorption marquée du procès alvéolaire mandibulaire.

Les observations ont de plus indiqué que le fait de changer la position des incisives inférieures pour la construction des prothèses peut contribuer à la résorption alvéolaire. Ainsi, on a constaté qu'un déplacement des bords incisifs des incisives inférieures de la prothèse en direction linguale par rapport à la position qu'occupaient les dents naturelles était lié à une résorption mandibulaire marquée.

Dans le groupe des prothèses complètes du haut et partielles du bas, la résorption du procès alvéolaire édenté de la mâchoire supérieure n'était pas étroitement liée à certaines caractéristiques de la morphologie faciale.

Dans aucun des groupes il n'a été constaté de relation marquée entre l'âge et la résorption.

Les résultats de cette étude indiquent que, chez les sujets devant recevoir des prothèses complètes haut et bas, on peut, par un examen approfondi des caractéristiques morphologiques de la face, et plus particulièrement de la mandibule, obtenir des informations importantes sur la réaction des procès alvéolaires au port des prothèses.

ZUSAMMENFASSUNG

DIE RELATION ZWISCHEN FAZIALER MORPHOLOGIE UND RESORPTION DES
PROCESSUS ALVEOLARIS BEI PROTHESENTRÄGERN

Der Zusammenhang zwischen der fazialen Morphologie und dem anterioren Alveolarknochenschwund zahnloser Kiefer wurde bei 22 finnischen Personen,

die 7 Jahre lang Prothesenträger waren, mit Hilfe von lateralen cephalometrischen Röntgenaufnahmen untersucht. Elf dieser Personen trugen eine Vollprothese sowohl im Oberkiefer als auch im Unterkiefer, die anderen elf trugen eine Vollprothese im Oberkiefer und eine partielle Freundprothese im Unterkiefer. Auf Grund der begrenzten Grösse der Untersuchungsgruppen wurde die Interpretation der Resultate mit grosser Vorsicht vorgenommen. Im Folgenden werden einige der ausgeprägteren Zusammenhänge angeführt.

Die Korrelationen zwischen Resorption und der fazialen Morphologie, die in der Totalprothesengruppe gefunden wurden, deuteten darauf hin dass die individuelle Variation im Alveolarknochenschwund in gewissem Zusammenhang mit der Morphologie des Unterkiefers stand. Eine Tendenz zu einer ausgesprochenen Resorption besonders am Processus mandibularis wurde bei Personen mit einer stark gebeugten Basis mandibulae observiert, während eine weniger deutliche Resorption bei Personen mit einer abgeflachten Basis mandibulae zu sehen war.

Ein Zusammenhang zwischen der alveolären Resorption und der antero-posterioren Position der unteren Inzisalkanten im Verhältnis zum Corpus mandibulae wurde ebenso observiert. Eine Tendenz zu einer ausgesprochenen Resorption des Processus mandibularis wurde bei Personen mit einer labialen Position der unteren Inzisalkanten bei der natürlichen Dentition beobachtet.

Weiterhin deuteten die Resultate darauf hin, dass Veränderungen der Position der unteren Frontzähne — entsprechend der Prothesenkonstruktion — bei der alveolären Resorption mitwirken können. Es wurde observiert, dass eine im Verhältnis zu den natürlichen Zähnen mehr nach lingual gerichtete Position der Inzisalkanten der unteren Prothesenzähne mit einer ausgesprochenen Resorption des Processus mandibularis verbunden war.

In der Gruppe Vollprothese im Oberkiefer — partielle Prothese im Unterkiefer zeigte die Resorption des zahnlosen Oberkiefers keinen engeren Zusammenhang mit der fazialen Morphologie.

In keiner der beiden Untersuchungsgruppen war ein Zusammenhang zwischen Resorption und Alter nachzuweisen.

Die Resultate deuten darauf hin, dass bei Personen bei denen Totalprothesen angefertigt werden, eine sorgfältige Untersuchung der fazialen und besonders der mandibulären morphologischen Charakteristika wertvolle Informationen über die Reaktion der Alveolarprocesse beim Tragen der Prothese geben kann.

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