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## POSITIONAL RELATIONSHIPS OF THE RETAINED PREMOLAR

### A CLINICAL-RADIOLOGICAL STUDY OF AN ORAL SURGICAL CASE MATERIAL

by

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#### INTRODUCTION

Oral-surgical literature contains little information on the retained premolar. *Dachi & Howell* (1961), in a report on a case material comprising 3,874 patients, were content to state that the premolars of the lower jaw occupied the fourth place with regard to retention frequency. As far as is known by the authors, no reports on the positional relationships of these teeth have been published. In view of this, the following account is given of a case material treated during the period 1960—1966 at the Department of Oral Surgery, Karlstad Central Hospital.

#### MATERIAL AND METHODS

The case material comprised 396 patients remitted in 1960—1966 for surgical treatment of totally 500 retained premolars in the upper or lower jaw.

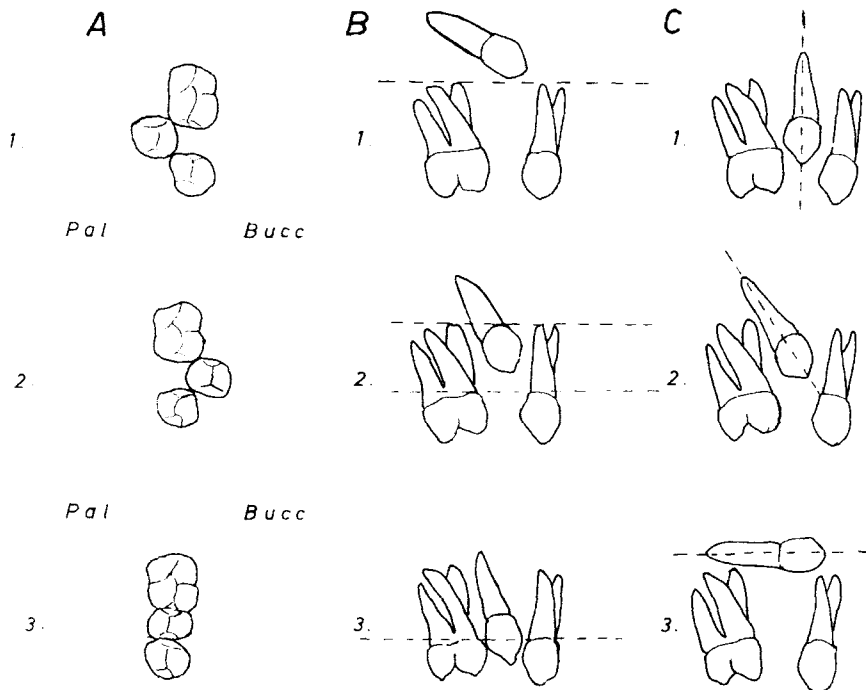
For sex distribution and the distribution of the retained premolars in the jaws, reference should be made to Table I. The age of the patients varied between 10 and 29 years (average age  $14\frac{1}{2}$  years).

Each patient was subjected to a thorough clinical and radiological examination. In the latter, several pictures were taken in different projections (orthoradial, eccentric and axial positions). These x-rays enabled the following three positional relationships to be judged (Fig. 1):

Table I  
*Distribution of the material according to sex and retained teeth*

Sex	No. of pat.	Number of impacted bicuspids								Total
		5+	+5	4+	+4	5—	—5	4—	—4	
♂	228	43	34	3	2	104	76	14	10	286
♀	168	22	15	0	1	75	70	17	14	214
Total	396	65	49	3	3	179	146	31	24	500
	Total	114		6		325		55		

### Position



A. The position of the crown of the retained premolar was determined in relation to the dental arch in the horizontal plane:

1. Palatal (lingual) position.
2. Buccal position.
3. Normal position in the dental arch.

- B. The position of the crown was judged in superior-inferior (retention level) to an adjacent erupted tooth (control tooth):
  - 1. The crown of the retained premolar situated superior to the apex of the control tooth in the upper jaw and inferior to it in the lower jaw.
  - 2. The crown of the retained premolar situated between the apex and the cervix of the control tooth.
  - 3. The crown of the retained premolar situated inferior to the cervix of the control tooth in the upper jaw and superior to it in the lower jaw.
- C. The slope of the tooth in the sagittal plane was estimated and classified in the following three groups:
  - 1. Vertical position.
  - 2. Inclined position.
  - 3. Horizontal position.

RESULTS

In our material, the examination showed that 278 teeth were situated in the right side of the jaw (210 in the lower jaw and 68 in the upper jaw). The corresponding figure for the left side was 222 (170 in the lower jaw and 52 in the upper jaw).

In the female patients, 82 retained premolars were found in the upper jaw and 204 in the lower jaw (approx. 57 %). The corresponding figures for men were 38 and 176 respectively (approx. 43 %).

Bilateral retention of the first and/or second premolar was found in 53 women and 49 men (totally approx. 25 % of the entire material).

As may be seen from Table II, approx. 50 % (252 out of 500) of the retained premolars were in the palatal (lingual) position. Most of the others, i.e. approx. 42 % (213 out of 500) were found to be in the normal position in the dental arch. Only about 8 % (35 out of 500) were in the buccal position.

Table II  
*Position in relation to horizontal plane*

Position	Tooth				Total
	5+5	4+4	5-5	4-4	
Pal. ling.	99	9	137	13	252
Buccal	1	0	26	8	35
In dental arch	14	3	162	34	213
Total	114	6	325	55	500

With regard to retention level (Table III), none of the teeth examined in this study was found to lie in a position superior to the apical plane in the upper jaw or inferior to this in the lower jaw. The majority, i.e. approx. 54 % (271 out of 500), were situated at a slight retention depth (inferior to the cervix of the control tooth in the upper jaw and superior to the cervix of the control tooth in the lower jaw). The remainder, approx. 46 % (229 out of 500) were situated between the cervix and the apex of the control teeth.

Table III  
*Retention level*

Position	Tooth		Position	Tooth		Total
	5+5	4+4		5-5	4-4	
Super. to the apex	0	0	Infer. to the apex	0	0	0
Between apex and cervix	25	4	Between apex and cervix	169	31	229
Infer. to the cervix	89	2	Super. to the cervix	156	24	271
Total	114	6		325	55	500

A study of the positions of the teeth in the sagittal plane (Table IV) revealed that the majority, approx. 49 % (244 out of 500), had a vertical position. In the rest of the examined material, approx. 44 % (222 out of 500) of the teeth had an inclined position and approx. 7 % (34 out of 500) a horizontal position.

Table IV  
*Position in relation to sagittal plane*

Position	Tooth				Total
	5+5	4+4	5-5	4-4	
Vertical	31	4	180	29	244
Inclined	77	2	124	19	222
Horizontal	6	0	21	7	34
Total	114	6	325	55	500

## DISCUSSION

This study was performed on remitted cases, which must to be regarded as selected, but which are nevertheless representative for oral-surgical activity.

As in frequency studies in respect of other tooth retentions (*Hellman*, 1936; *Paatero & Kiminki*, 1962; *Nordenram*, 1966; *Nordenram & Strömberg*, 1967), the authors found that retentions were slightly more common in women than in men, although the difference was small (approx. 57 % as against 43 %). The difference between the sexes with regard to bilateral retention was even smaller (53 women as against 49 men).

Retained premolars were more common in the right side of the jaw. This was also found with regard to retained canines in the upper jaw (*Röhler*, 1929; *Nordenram & Strömberg*, 1967).

The second premolar in the lower jaw was most frequently retained. It was generally found in the dental arch with the crown between the apex and the cervix of the control tooth, and with its longitudinal axis in the vertical position.

The next tooth in order of retention was the second premolar in the upper jaw. This tooth differed from the others in that the retention level for the majority (89 out of 114) was inferior to the cervix of the control tooth. Further, most of the second premolars in the upper jaw (77 out of 114) had an inclined position in the sagittal plane.

The first premolar was more seldom retained (61 out of 500). Most of those noted during this study were situated in the lower jaw (55 out of 61).

## SUMMARY

The material presented included five hundred retained premolars, found in 228 women and 168 men. The positional relationships of these teeth were specifically investigated.

Bilateral retention was thus found in approximately 25 % of the entire material. About one half of the retained premolars were in a palatinal position. Most of the others, i.e. 42 %, were in a normal position, while only about 8 % were in a buccal position.

With regard to the retention level, approximately 54 % were situated at a slight retention depth. The level of the cusps of the remaining 46 % was between the cervix and apex of the neighbouring teeth.

Approximately 49 % were in a vertical position, while 44 % had an inclined position, and 7 % a horizontal position.

The second premolar in the lower jaw was most frequently retained.

## RÉSUMÉ

## RAPPORTS DE POSITION DES PRÉMOLAIRES INCLUSES

Le matériel de la présente étude comprenait 500 prémolaires incluses trouvées chez 228 femmes et 168 hommes. Les rapports de position de ces dents ont été étudiés de façon spécifique.

On a ainsi trouvé une inclusion bilatérale dans environ 25 % de l'ensemble du matériel. Environ la moitié des prémolaires incluses se trouvaient du côté palatin. La plupart des autres, soit 42 %, étaient en position normale, alors qu'environ 8 % seulement étaient en position vestibulaire.

En ce qui concerne le niveau d'inclusion, approximativement 54 % des inclusions étaient peu profondes. Le niveau des cuspidés des 46 % restant était situé entre le collet et l'apex des dents voisines.

Approximativement 49 % étaient placées verticalement, 44 % étaient inclinées et 7 % étaient placées horizontalement.

La dent le plus souvent incluse était la deuxième prémolaire inférieure.

## ZUSAMMENFASSUNG

## TOPOGRAFISCHER SITUS RETINIERTER PRAEMOLAREN

Einleitend wird darauf hingewiesen, dass nur einige wenige Verfasser das Problem des retinierten Praemolaren behandelt haben. Da eine oralchirurgische Behandlung dieses Zahnes relativ oft indiziert ist, haben es die Verfasser des obigen Artikels für angebracht gehalten ein Material von 500 retinierten Praemolaren hinsichtlich ihres topografischen Situs zu untersuchen.

Das Untersuchungsmaterial ist während der Jahre 1960—1966 an der Zentralzahnpoliklinik des Zentralkrankenhauses in Karlstad (Schweden) gesammelt worden und verteilt sich auf 228 weibliche und 168 männliche Patienten.

In 25 % der Fälle lag bilaterale Retention vor. Was den Situs der Zahnkrone bezüglich der Horizontalebene betrifft, so lagen 50 % der untersuchten retinierten Praemolaren palatinal (lingual), 42 % im Zahnbogen und 8 % buccal. Hinsichtlich des Retentionsniveaus in der Vertikalebene wurde die Lage der untersuchten retinierten Praemolaren in 54 % der Fälle als »oberflächlich« und in 46 % als »mitteltief« (die Höckerspitze des retinierten Praemolaren lag zwischen Cervix und Apex der Nachbarzähne) bezeichnet.

In der Sagittalebene befanden sich 49 % in vertikaler Position, während 44 % schräg und 7 % horizontal verlagert waren.

Der am häufigsten retinierte Zahn dieser Untersuchung war der zweite Praemolar im Unterkiefer (325 von 500). Dieser Zahn lag im Allgemeinen im Zahnbogen mit der Krone in »mitteltiefer« Position in vertikaler Lage.

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