Disorders of the temporo-mandibular joint.

Causal factors and the value of temporo-mandibular radiographs in their diagnosis and therapy.

By

GÖSTA LINDBLOM.

The aims of the investigation.

This article furnishes a report of an investigation undertaken with the purpose of shedding light on the hitherto somewhat obscure causes of the disorders of the temporo-mandibular joint, and to ascertain the value of radiographs of this region in the diagnosis and therapy.

Definitions.

The term *arthrosis of the temporo-mandibular joint* may be defined as *a primarily non-inflammatory disturbance of the normal function of this joint.*

In this paper the *Haderup Classification* for identification of the teeth is employed.

The various types of teeth tre represented by numbers, counting from the medial incisors (1) to the third molars (8).

+ indicates *Maxillary* and — *Mandibular* teeth.

The + or — is placed before or after the figure to indicate *Left* or *Right*, respectively.

e. g. + 5 means the second upper left premolar.
6— » » first lower right molar.

For the sake of convenience the following abbreviations — extracted from the key to the survey table — have been used in this paper:

l = left
r = right
lc = left condyle
rc = right condyle
TM = temporo-mandibular (joint)
L = lower jaw
U = upper jaw

Degenerative changes, generally included under the term *arthrosis*, have purposely been omitted from this definition as it has, of course, been impossible to carry out an examination of the case series in question to determine their occurrence. It is the disturbed normal function of the joint that is first revealed by clinical examination and after treatment it is the rehabilitation of this function that is the most easily recognized result of the therapy.

It is easily realized, then, how wide the frontiers are within which these joint disorders lie, and how little is still known of the real causes. There are certainly many factors involved, some of which come within those spheres of medicine where the dentist is out of his depth. Experience has shown, however, that in a large number of cases of suffering the fundamental causes are of a purely dental nature.

The case series.

The case series of this investigation was constituted by patients of the author's private practice together with a number of those remitted for diagnosis and suggestions as to treatment.

It is reasonable to suppose that the very fact that these patients were referred for specialist attention implies that the degree of severity of the cases was considerably greater than that which would apply to the clientele of an average private practice. In this material there were higher percentages of, for example, deep bite cases and malocclusions of a more serious nature than is generally met with. It should be added that these disorders of the joint were in fact the reason for the remission of these patients.

Some selection of cases was found desirable:

(1) Only those where an initial X-ray of the TM examination had been performed were included — these numbering some 300.

Bite analyses with casts mounted in individually adjustable articulators were carried out for all but a few cases, these in some way exceptional.

(2) Of the 300 available the only cases included in the investigation were those where the patients either personally sought advice or were found on examination to present symptoms from one or both joints — 83 cases in all.

(3) As the case series covers some 18 years it was unfortunately not possible to re-examine and record details of all of them; some, for instance, had moved to new addresses, while others had passed away. There was thus a further reduction in the number of cases to 58, all of which were fully checked.

For the age distributions of the patients 10-year intervals were found most suitable. The figures are tabulated below, with a further grouping into sexes.

Age groups	10—19	20—29	30—39	40—49	50—59	60—69	Total	Min. and max. ages
Males	1	1	3	3	5	—	13	17—57
Females	3	11	9	10	9	3	45	16—68

Types of temporo-mandibular joint.

The classification of the joint types was made with the guidance of TM radiographs, two independent groupings being performed — one by the present writer and the other by an X-ray specialist. Ordinary visual reading of the radiographs was considered sufficient.

Three types of TM joint were distinguished: shallow (= Fl), normal (= N) and deep (= Dj). These are recorded in the separate survey table accompanying this article.

This somewhat rough classification was accepted for the immediate purpose, while another investigation was proceeding which aimed at establishing a more precise and definitive classification of the TM joint.

The independent classifications agreed in the majority of cases within satisfactory limits. In those instances where uncertainty existed regarding the group in which the joint was to be included, the shallower was chosen, a + being added to indicate that there was a tendency to the next higher group. (See survey table.)

The TM type distribution for the 58 patients was as shown in the following table.

No. of cases	Shallow	Normal	Deep	Total joints
58	9	64	43	116

Types of bite.

The classification of the various bites found in the case series was effected in accordance with the grouping set out below.

Bite type		*Incisor bite relationship*		
Normal	= N	HI = horizontal		
Deep	= Dj	VI = vertical		
Extremely deep	= E Dj	These were further sub-divided:		
Post-normal	= PN			
Extreme post-normal	= E PN	HI	Normal	= 0—3 mm
			Post-normal	= 3—6 »
Edge-to-edge	= K		Extr. post-normal	= 6 mm +
Progenic, genuine	= Pg			
Progenic, acquired	= H Pg	VI	Normal	= 0—3 mm
			Deep	= 3—6 »
Open bite	= ÖB		Extr. deep	= 6 mm +
Abrasion	= AB			

The term *normal* has been applied to

complete rows with good articulation, and

defective rows with retained vertical dimension and good articulation.

For both these groups the incisor bite relationship was *normal:* HI = 0—3 mm, VI = 0—3 »

The bite types of the 58 cases examined were distributed in the following way:

Normal:	total 17 cases:	3, 4, 10, 12, 14, 16, 18, 19, 23, 28, 34, 35, 39, 40, 41, 49, 51.
Deep:	total 15 cases:	1, 6, 11, 17, 26, 27, 30, 32, 36, 37, 42, 50, 52, 53, 56.
Extr. deep:	total 6 cases:	1, 8, 20, 24, 31, 47.
Post-normal:	total 5 cases:	2, 21, 22, 30, 48.
Edge-to-edge:	total 2 cases:	5, 29.
Progenic, genuine:	total 1 case:	7.
Progenic, acquired:	total 2 cases:	45, 55.
Open bite:	total 1 case:	9.

Total = 48 cases.

In 10 cases there were insufficient data to permit classification: 13, 15, 28, 33, 38, 43, 44, 46, 54, 58.

It will be observed that certain bites were included in two groups — as, for example, PN and Dj.

Clinical symptoms.

A scrutiny of the literature on arthrosis of the TM joint will reveal a certain lack of uniformity in the case histories and the indication of various symptoms. The Costen syndrome probably represents the culminating point of a far reaching attempt to provide a comprehensive and thorough list of all the symptoms. In the present investigation the author has concerned himself only with fairly easily recognizable symptoms — all of a purely dental character.

In determining these symptoms ordinary simple clinical methods were used — palpation and auscultation for example.

1. Symptoms from the joints:

Crepitation, crackling, snapping:		
both joints:	total 13 cases:	1, 2, 7, 9, 12, 15, 24, 29, 31, 33, 46, 47, 55.
right joint only:	total 6 cases:	10, 18, 22, 35, 42, 53.
left joint only:	total 24 cases:	3, 6, 11, 14, 16, 17, 23, 25, 26, 27, 28, 30, 34, 37, 38, 39, 40, 41, 45, 48, 50, 51, 52, 58.
Pain on opening:	total 9 cases:	4, 12, 17, 31, 34, 36, 37, 40, 43.
Pain on chewing:	total 6 cases:	27, 37, 40, 43, 51, 53.
Aching:	total 14 cases:	3, 8, 12, 15, 16, 19, 22, 27, 28, 36, 39, 43, 49, 51.
Luxation of both condyles:	total 2 cases:	20, 44.
» right condyle only:	no case.	
» left condyle only:	total 5 cases:	1, 2, 3, 37, 38.
Difficulty in opening, especially in the morning:	total 30 cases:	1, 2, 3, 4, 10, 11, 12, 15—19, 22—28, 30, 31, 32, 34, 36, 41, 50, 52, 54, 56, 57.
Mandible locks completely at a certain position on opening:	total 9 cases:	1, 2, 11, 13, 24, 30, 44, 54, 56.

Tenderness on applying pressure over joint where there is other discomfort:	total 15 cases:	1, 4, 8, 11, 12, 16, 20, 22, 25, 27, 28, 30, 32, 36, 51.
Pain on biting together on hard or tough objects:	total 20 cases:	1, 6, 11, 12, 15, 17, 18, 19, 22, 25, 26, 27, 28, 30, 35, 36, 37, 38, 43, 48.
Pains alleviated on biting together on hard or tough objects:	total 1 case:	49.
Lower median line displaced laterally on *closing* in habitual centric occlusion:	total 13 cases:	2, 5, 7, 13, 17, 21, 27, 44, 45, 48, 52, 57, 58.
Lower median line displaced laterally on *opening* from habitual centric occlusion:	total 15 cases:	3, 11, 12, 15, 18, 22, 23, 28, 30, 34, 39, 41, 51, 52, 54.
Lower median line displaced sagittally:	total 3 cases:	20, 44, 45.

2. Symptoms from the ears:

Rustling, ringing, etc.:	total 3 cases:	27, 46, 52.
Hearing impaired:	total 7 cases:	14, 21, 29, 31, 47, 52, 55.

3. Other symptoms

such as neuralgic pains and troubles of a more peripheral nature associated with the TM joint were noted in a separate column in the survey table.

In this case series it was not possible to confirm with any degree of certainty whether the crepitations and crackling were intermediary or terminal — *i. e.* whether they occurred at the beginning or towards the end of the opening movement; for this reason no differential diagnosis was attempted.

Crepitation, crackling and snapping were the most common symptoms, occurring in 43 of the 58 cases, either bilaterally (13 cases) or unilaterally (30 cases); the right joint was involved in 6 and the left in 24 cases.

In only 6 of the 43 did these particular symptoms occur alone, while in the rest they were detected in combination with others.

Difficulty in opening in the morning was the next most common symptom — 30 cases.

Pain on biting together on hard, or above all on tough, objects — 20 cases; tenderness over the joint concerned with other symptoms — 15 cases. In 9, locking of the mandible occurred at a certain point on opening.

Deviation of the lower median line in 13 cases on *closing* in habitual centric occlusion and in 16 cases of *opening* from correct centric occlusion.

Rustling and ringing in the ears — a symptom mentioned as being comparatively common, at least in the American literature — occurred in but 3 cases.

Impaired hearing — 7 cases, of which 4 were purely severe otosclerosis, 2 with less certainty but suspected, and in these cases an improvement by dental treatment was excluded from the outset. Only in the last of the seven, Case 55, was the prospect of successful dental treatment favourable. An extreme raising of the bite[1] was made with forward movement of the mandible, implying displacement of the condyles from their retruded positions in the fossae; the result came up to expectations. Some 25 years of experience of such cases of reduced hearing have taught the author that one must exercise great caution when deciding whether or not the disorders are actually due to dental causes and are thus curable by dental therapy.

A careful examination should be undertaken by an ear specialist so as to eliminate where possible all causes other than purely dental. There will still remain a limited number of cases, but in these dental treatment can reasonably be expected to yield a positive result; this therapy consists to a large extent of the restoration by one means or another of the physiological vertical dimension.

Luxation of both condyles in 2 cases and of one joint in 5 cases. Oddly enough, all these concerned the left condyle.

---

[1] In this paper the expression "bite raising" is used to mean a reconstruction of the bite in question to the correct (physiological) vertical dimension.

Therapy.

The treatment applied is given in the survey table under the main heading "*Therapy*", with sub-headings *Symptomatic heat treatment; Spot-grinding; Temporary splints; Permanent prosthetic;* and *Other treatment.*

Bite analyses and *suggested therapy* are included although they are of course not therapy in the literal sense of the term but rather associated with diagnosis and planning of the treatment.

Bite analysis with study casts mounted in individually adjustable articulators were performed in 36 cases.

Suggested therapy in 38 cases.

Symptomatic heat treatment, such as diathermy, ultrashort wave, heat lamp, etc. have been applied in 17 cases. In 14 of these heat treatment alone was used.

Spot-grinding alone in 7 cases.

Temporary splints were used in 18 cases, 4 of them without subsequent permanent treatment.

Permanent reconstruction of the bite — 26 cases.

Report of cases treated.

The cases are divided into groups according to the treatment applied.

In each group the symptoms that induced the patient to seek advice are stated in turn, together with the results of examination — especially X-ray —, the treatment and the results; the latter being divided into those immediately evident and those perceived on a subsequent follow-up examination performed in the spring of 1951. A short discussion accompanies each group.

The reader is referred to the survey table for closer details of the individual cases.

Attempts were made to resolve the causes of the disorders of the TM joints, after which a comparison between the clinical findings and the changes diagnosed by X-ray examination was carried out by a consistent procedure.

Finally, it was established whether or not a positive result was forthcoming.

"Positive result" implies complete disappearance of the disorder, at least until the follow-up examination.

Group 1: Cases treated with heat and rest only.

Of the 14 cases where heat treament and rest were prescribed, and the patient advised to wait on developments *i. e.* Cases 4, 11, 12, 15, 18, 19, 23, 25, 26, 28, 32, 38, 43, 54.

7 displayed no displacement of the median line on closing (4, 19, 25, 26, 32, 38, 43). Obstruction of gliding can be ruled out here (as with the other 6 cases). Some of the symptoms had existed several years — from 6 months to 8 years previous to seeking advice; others had appeared overnight — 19 cases.

Case 25 — discomfort in rc almost immediately after two permanent bridges had been inserted in rU.

Case 43 — discomfort in rc after falling downstairs and striking chin; radiograph shows asymmetric rc (Fig. 1).

All 7 cases showed a *positive result;* in two cases some symptoms recurred sporadically in the cold seasons, disappearing, however, on application of heat treatment.

Of the causes of these disorders of the joints it is impossible to say more, except in connection with *Cases 25 & 26*, where occlusal trauma certainly existed from the beginning, although to no serious degree, the joint accomodating itself (pressure on the disc), and in *Case 43*, where the original cause was clearly a fracture.

In the other 4 cases the occlusion and articulation in any case can be excluded as causal factors.

An examination of the radiographs of these cases shows, as is to be expected, no asymmetric position of the condyle in habitual centric occlusion (as, of course, there was no lateral displacement of L on closing). In *Case 25* the radiograph shows an extreme opening movement of the condyles, especially the lc (which was correct after treatment). This may well indicate thickening of the disc.

Case 26 also displayed abnormally great opening movement in the vertical direction. A thickening of the disc might have been associated with tenderness of the molars experienced on closing.

Case 32 — radiograph shows that the lc is a little behind rc on opening. Tenderness over lc.

Case 38 — radiograph shows the lc head somewhat flattened on the upper anterior part.

Case 43 has already been mentioned; a clearly asymmetric placing of rc.

Case 54 — radiograph shows rc with obviously widened space between condyle and fossa, stationary on opening (Fig. 2).

The following TM types are represented in this group:

Case	*Bite*	*Joint*
4	Dj	Dj
19	N	N
25	PN	N
26	Dj	N
32	Dj	Dj
38	no details	N
43	» »	Dj
54	» »	Dj

The remaining 6 cases — 11, 12, 15, 18, 23, 28 — indicated a *deviation of the lower median line on opening from habitual centric occlusion* (where no deviation was noticed) *to full opening.* This might be explained as being due to a disturbance of one or another type in the function of the *discus articularis.* The symptoms had in one case (15) existed since childhood, while the other had had the symptoms between 3 weeks and 6 months previous to the visit.

Complete disappearance of symptoms following heat treatment in *Cases 11 & 23.* (In Case 11, — 5 was extracted in addition, as it locked the bite; this probably contributed to the improvement.)

Case 28 responded with a positive result except that a snapping remained, although diminished.

Case 18 — symptoms considerably improved after extraction of retained 8—.

The two remaining cases, *12 & 15*, were clearly not of a dental nature. For some years there had existed some general joint disorders accompanied by severe facial neuralgia; physicians had been consulted with occasionally successful results.

In all these cases the radiographs of the *habitual centric occlusion* illustrate symmetric and normal position of the condyles, as would be expected.

On the other hand the radiographs of opening movements show in all cases a clearly reduced deviation in the forward-downward movement of the condyle.

Case 11 — lc stopped halfway (Fig. 3). This is in accordance with the journal entry that L deviated to the right when the opening movement exceeded $2^1/_2$ cm.

Case 23 — difficulty in opening more than $2^1/_2$ cm and at 3 cm L shifts to the left — corresponding to the width of two L incisors, which is a large displacement. The radiograph shows that rc moves more than lc forwards and downwards in order to slide ventrally on the tuberculum articulare at 3 cm (Fig. 4). This is a typical picture of unilateral luxation, probably due to laxity in the capsule wall.

Case 28 — L moves to the left on opening and the radiograph of the open position shows that rc is farther from the tub. artic. (thickened disc?) but as far as the lc ventrally.

It is seen that there is here a striking agreement between the clinical picture and the radiograph. The bite and joint types in these cases were:

Case	*Bite*	*Joint*
11	Dj	Dj
12	N	Dj
15	no details	Dj
18	N	Dj
23	N	N
28	no details	Fl

Group 2: Spot-grinding only.

This group included those cases that were treated with grinding, without previous heat treatment or permanent reconstruction. They were Cases 4, 8, 9, 10, 45, 48, 51 — a total of 7. In *Case 45* the 4 upper incisors were given jacket crowns, as these teeth locked the bite in all directions on account of their inverted position inside the lower incisors.

In *Case 8* the 6+ was extracted. Since the extremely peculiar complex of symptoms did not disappear until this had been

performed the basic cause of the "joint disorders" may well have been the focal infection that was found over the roots, rather than the disturbance in the articulation that was corrected by spot-grinding. Complete freedom from symptoms followed the removal of the tooth.

In all the other 6 cases grinding gave a completely positive result. The position of centric occlusion remained constant, moreover. The observation period for these cases varied between 3 (one case) to 15 years.

Case 9 presented open bite with occlusion only from the first molars backwards and without deviation of the lower median line. Deviation was also absent in *Case 10*. In the remaining 4 cases incorrect positioning of the mandible through cuspal guidance existed, the L median line being displaced laterally in habitual centric occlusion; *Case 45* presented a forward movement. By spot-grinding the mandible was returned to its correct position. In all these 4 cases the radiographs showed a clear diagnosis of malposition and after treatment the condyles were seen to be correctly positioned in their fossae (Fig. 5).

In all 6 cases the dental origin — misdirection of the mandible by cuspal guidance — was indisputable.

The bite and TM types in this group were:

Case	*Bite*	*Joint*
4	N	Fl
8	E Dj	Dj
9	ÖB	Fl
10	N	N
45	HPg	N
48	PN	Dj
51	N	Dj
54	no details	Dj

Group 3: Temporary splints without subsequent permanent treatment.

Only 4 cases fell in this group: 22, 30, 49, 50, and in one only (30) can the treatment be said to have yielded a positive result. (See below.)

Case 22 treated in December 1945 had had the left disc extirpated in May of the same year on account of pains in the joint. In the autumn similar pains were experienced in the joint

and the patient was remitted to the author. An analysis of the bite was performed and radiographs taken (Fig. 6). Two splints were then constructed and cemented temporarily in January '46. The bite was raised 2 mm to relieve the condyles. These splints were worn with occasional intervals until February '47, and periods of pain alternated with symptomfree spells. As there was no evident improvement no major interference with the intact bite was indicated and it was decided to wait for a time. The patient did not communicate further and at the follow-up examination in June '51 the following information was given. In 1947—48 the situation was fairly satisfactory. In the autumn of '48 the pains recurred, then in both joints, and in January '49 the right disc was extirpated. As the discomfort continued the patient finally consulted an oral surgeon who chiselled out a retained — 8. There was subsequently no discomfort but restricted normal mobility of the joints remained. The case is a problematical one as far as the origin of the trouble is concerned, but it serves as a warning of what so serious surgical treatment as disc extirpation can lead to, if it is undertaken only on indication of pains in the joints or surrounding parts. The retained third molars cannot be excluded as the possible cause. The 8 — is retained and has still not been attended to (June '51).

Case 30 yielded a positive result in the temporary relief of the lc, effected by means of temporary splints (Fig. 7). These were fitted in November '49 and worn until February '50 when they were removed. The patient now opens without obstruction or deviation, chewing normally with neither pain nor aching over the joints. There is, however, still occasional light snapping in the left TM joint.

Case 49 has indicated some improvement of the symptoms connected purely with the joint since 4 months treatment with splints. As other symptoms of malignant neuralgia around the right eye, ear, neck and throat muscles remain, with occasional symptoms of paralysis, and these resist medical and physical therapy, no conclusions could be drawn as to the dental cause and the result of dental treatment.

Case 50 must also be considered as uncertain as to the real cause. The patient sought advice in September '48 for severe neuralgic symptoms of the left half of the face that had pre-

vailed for six months — pains emanating from the parotid tract down to the neck. As there was difficulty in opening more than 2 cm, crackling in the lc, pains in the joint on closing and radiographs indicated that a dental origin might be suspected, splints were fitted to supply relief from loading of the joints — November '48 — raising the bite 2 mm. These splints were worn permanently until January '49 and thereafter from time to time until April, but with no apparent improvement.

In May the patient visited a chiropractor who gave treatment with the result that all symptoms disappeared completely. Although a clear dental defect was in evidence the immediate cause was probably associated with some unknown factors, so that the case must be written off as far as this investigation is concerned.

Of the 4 cases that fall in this group (treated with temporary splints) only Case 30 can be said to have yielded a completely positive result. It should be observed, however, that this is the only one that presented a purely dental picture, free from complications.

Case 22 was already traumatized through a previous disc operation and by the second extirpation of the other joint, so that the case is so complicated as to defy an unconditional judgement.

Case 49 — improvement of the dental symptoms was evident but the severe and complicated neuralgia dominated both the picture and the result.

Case 50 also presented severe neuralgia, the dental therapy giving no result, while on the other hand both dental and neuralgic discomfort disappeared after consulting the chiropractor; see case history, above.

The bite and joint types present in this group were:

Case	*Bite*	*Joint*
22	PN	Dj
30	PN	N
49	N	N
50	Dj	N

Radiographs in these cases:

Case 22 — lc still on opening; at 3 cm L deviated to the left a distance equivalent to the width of two lower incisors. This

of course was to be expected. The habitual centric occlusion was normal (this was before the second disc operation of the right joint).

Case 30 — habitual centric normal. On opening, rc moved a little forwards and downwards. There appeared to be some disc obstruction. Relief with splints resulted in normal mobility in this joint compared with the other.

Case 49 — radiographs show no abnormality in habitual centric occlusion (no deviation). X-rays have served as a criterion of the correct vertical dimension with the new splints.

In *Case 50* the radiographs show clearly a deformed lc (Fig. 8). In habitual centric occlusion the condyles are symmetrical and somewhat distal of normal. On opening, both move too little in the sagittal direction.

In these four cases the radiographs can be said to have confirmed the clinical findings in respect of the disturbed function of the TM joints.

Group 4: Permanent reconstruction of the bite.

If a scrutiny is made of the 26 cases where permanent reconstruction of the bite was performed it is found that

(1) this treatment was preceded by temporary splints in 14 cases (the permanent constructions retained identically the same jaw position).

(2) the deviation of the median line (*i. e.* misdirection of the L in habitual centric occlusion by cuspal guidance) occurred in 12 cases: 2, 5, 7, 13, 17, 27, 41, 44, 45, 52, 57, 58.

(3) there was no deviation of the median line in 14 cases.

(4) L was simultaneously directed forwards in 3 cases: 20, 44, 45.

(5) *in all 26 cases the therapy yielded a positive result i. e.* wherever deviation had existed it disappeared. The patient opened and chewed without discomfort and was quite symptomfree at the joints. The bite is still in the correct position (2 cases after one year and the rest for longer periods up to 20 years). Of these 26 cases there were 5 with impaired hearing. Cases 22 & 47 were diagnosed as otosclerosis so that there was no dental con-

nection. Two (14 & 52) were not diagnosed but otosclerosis was suspected; their condition remained unchanged. In *Case 55* full hearing was restored through bite reconstruction — an increase of 10 mm in the vertical dimension (measured on the incisal pin).

From the *X-ray findings* column:

(1) Of the 12 cases where deviation of the L median line existed, 7 show obvious forward and downward displacement of the joint on the side opposite to the direction of the lateral displacement (2, 5, 7, 17, 27, 41, 58) (Fig. 9).

(2) 1 case (13) indicates a similar condition although with less certainty.

(3) 2 cases show only check in the correct position after raising (52, 57).

(4) 2 cases (44 & 45) belong to the group where L was at the same time directed sagittally forward by cuspal guidance. Case 20 belongs also to this category.

If such an investigation had been carried out with the whole material of 300 patients, agreement would have been more obvious.

In fact relatively few cases were dealt with in this investigation — those with disorders of the TM joint —, while all those were excluded where malpositions due to obstruction had been corrected but where no disorder was found. These show practically a 100 % agreement between clinical symptoms and the X-ray findings.

One fact that can be stated with confidence, then, is that *the radiographs of the TM joints, if taken correctly, provide a realiable diagnosis of incorrect habitual centric occlusion and of the corrected position (with symmetrical condyle positions of both joints)*.

In the other 14 cases where no deviation existed in the bite the radiographs have confirmed this (1, 6, 14, 24, 29, 33, 35, 36, 37, 42, 47, 53, 55, 56).

In 3 cases (1, 24, 42) there was manifest retrusion (distal position) of both condyles in habitual centric occlusion. 3 cases of deep bite — 2 of them extreme — called for extreme raising of the bite of 5, 8 and 6 mm (see below) (Fig. 10). In all these cases the X-ray controls served as criteria of a physiologically

correct bite reconstruction, entailing in the majority of cases bite-raising of 2, 3, 5, 6, 7 & 10 mm (see below).

Case 29 that was raised 7 mm is an extreme example of abrasion, where only the original vertical dimension was restored.

Cases 6 and 53 wore partial dentures — both lower — the former on both and the latter on one side, where the molar region was restored to its original height to provide relief of the overloaded condyles. In both cases symptoms from the joints appeared after loss of these molars. Almost immediate and permanent freedom from symptoms was effected.

Case 36 is interesting in so far as it was first treated by another dentist. He applied temporary splints and raised the bite 5 mm, but with no satisfactory result. The present author performed a bite analysis, took radiographs, etc. which revealed incorrect centric occlusion, requiring that the splints should be lowered to 3 mm and the habitual centric occlusal position corrected (Fig. 11). Within two months an improvement was evident. There are at present no symptoms from the joints. The case was, however, complicated by hitherto unrelieved neuralgia of a severe nature. Fig. 11 shows clearly the incorrect centric position and the corrected state.

Fig. 47 is an extremely interesting case.[1]

In 1934 extreme raising of the bite together with an advancement of the mandible appeared at first to have been successful. Between 1936 and 1939, however, the L gradually retruded 5 mm, since the bite was lowered by 4 mm, the molar and premolar regions of both jaws being intruded into the jaw process so that the condyles thus returned to their fossae. In this case the joint diagnosis by radiograph had been quite decisive and provided moreover an acceptable explanation of the whole status. With regard to what has already been said concerning the theoretical basis for bite-raising and its practical application[2] the following principles may be stated.

If the L is displaced distally on account of sinking of the bite — which can clearly be seen from radiographs — raising should be effected until the condyles go forward automatically and assume their normal positions in the fossae (Fig. 10).

[1] A more detailed description is given in Apollonia p. 439.
[2] See Apollonia, p. 461.

If genuine deep bite exists and it should be desirable to reduce the vertical overbite in the anterior part (popularly termed "raising the bite") to provide a better chance of good articulation, such a raising can be performed so long as the condyles rotate about the inter-condylar axis. This is checked with radiographs. If the condyles, on further raising, move forewards and downwards the limit for the raising of the bite may be overstepped.

In general this pure rotary movement about the intercondylar axis occurs with opening movements up to about 3 mm, measured on the incisal pin in the articulator. For further opening to 5 mm it is uncertain whether the condyle will begin to move forwards and downwards, while for opening movements in excess of 5 mm (measured on the incisal pin) the condyle does as a rule execute this displacement. This applies to "normal" cases and has been checked with a large number of radiographs. In extreme deep bite, openings of more than 10 mm have been measured where the condyle's only movement has been rotary. From this raising measured in millimetres on the incisal pin in the articulator, 2—3 mm were subtracted in order to leave *a freeway space* between the reconstructed rows of teeth.

The remaining distance can, if necessary, be used for the permanent reconstruction or the temporary splints. This is not absolutely necessary, however, and it should not be forgotten that a prolongation of the clinical crown at the expense of the clinical root always incurs some risk of paradental disturbance and that the freeway space in deep bite is normally often a good deal greater than 3 mm (see Fig. 12). The present author has himself found cases of three times this figure (see Brit. Dental Journal, Aug. 1950; S. T. T. Vol. 1—2, 1950).

If all cases of bite raising from the author's material were included this would have been still more clearly demonstrated. This would seem to emphasize the significance of the joint radiograph to the establishment of a physiologically correct vertical dimension. (See author's previous papers on this subject.)

An examination of the results of the treatment of these 14 cases without deviation will show that *all of them yielded a positive result.*

In addition, the following details may be of interest:

Case 24 — some arthritic symptoms remained, it is true, though the joint symptoms had disappeared completely.

Case 35 — the old symptoms may return with *extreme* opening movements but not within normal physiological limits.

Case 37 — slight crackling remained, while luxation disappeared and mobility was unrestricted.

Case 36 shows complete freedom from symptoms as far as the TM joint is concerned, but the neuralgia persisted.

Case 47: this, one might say, treated itself. (See Apollonia, p. 439.)

The bite and joint types of the 26 cases comprising this group are given below.

Group I.			*Group II.*		
With deviation	*Bite*	*Joint*	*Without deviation*	*Bite*	*Joint*
Case 2	PN	N	Case 1	E Dj	N
5	K	Dj	6	Dj	N
7	Pg	N	14	N	Fl N
13	no details	N	24	E PN or Dj	N
17	Dj	Dj	29	K	N
27	Dj	N	33	no details	N
41	N	Dj	35	N	N+
44	no details	N—	36	Dj	N
45	H Pg	N	37	Dj	N+
52	Dj	Dj	42	N	Dj
57	E PN	Dj	47	E Dj	N
58	no details	N	53	Dj	N
			55	Pg	Dj
			56	Dj	N
	Total 12 cases			Total 14 cases	

The mandible was directed forwards in combination with some lateral displacement:

Case	*Bite*	*Joint*
20	E Dj	N
44	no details	N+
45	H Pg	N

Cases not treated.

The following 7 cases received no treatment at all. They are however recorded for the sake of completeness since they provide examples of complicated sets of symptoms that might result in wrong diagnoses. Moreover, they have shown a more unusual course as far as it has been possible to follow them.

Case 3 — crepitation and aching in the left joint which luxated in opening. It was difficult to open more than 2 cm, at which point there was deviation of L median line to the right. The patient had suffered may years from severe neuralgia and a chiropractor was eventually consulted in 1948. A follow-up examination in 1951 showed unrestricted opening, painless and without deviation; no discomfort at the joint. The neuralgia remained, however, with occasional periods of freedom.

Case 16 was first met in February 1948 when advice was sought in connection with disorders of the joint: crepitation, aching and soreness of the left TM joint, and difficulty in opening in the morning. The case history showed severe neuralgia on the left half of the head since 1945 when a lower molar on this side was extracted on account of pain. Incurable sporadic pains were experienced. As no direct dental cause was suspected and the bite could not be associated with the joint trouble, nothing was done. In June 48 the situation became unendurable and a radical operation of the trigeminal root was undertaken after which all pains and joint trouble disappeared. By June 51, however, sensation was still absent in the whole of the left half of the face, throat and tongue.

Case 21 — no action taken and the status remained unchanged. The patient had never had any real discomfort and there was only a lateral displacement of the median line which was discovered on examination; it was suggested that this be corrected.

Case 31 — audible snapping in both TM joints; pain and difficulty in opening for some 5 years. Bite analysis was performed but no treatment. The disorder gradually disappeared of its own accord. June 51, symptom-free. Reduced hearing capacity of right ear remained.

Case 39 — in many respects resembling Case 16. No measures taken by any dentist. On the other hand, many specialists were consulted for the severe neuralgia, and radical surgical treatment had been advised, but the patient made no decision. The situation was unchanged in June 51.

Case 40 — crepitation and pains in the left TM joint on chewing and opening. Advised a fixed bridge in the left of the mandible and balancing of articulation. No action taken. Imperceptibly and spontaneously all discomfort from the TM joint since

1949 disappeared so that in June '51 the patient was completely free from symptoms.

Case 46 remitted in December 1942 for crepitation in both joints and rustling and ringing in the ears. Patient had worn a complete denture for 20 years, and the disorders seem to have developed gradually since insertion of denture. This denture was obviously too low and it was suggested that it should be raised by 8 mm. This was checked radiographically. A follow-up examination was made in January '51, which revealed that the patient since 1942 had twice had alterations made in the dentures by other dentists, who disregarded the diagnosis and suggested therapy of the present author. Poor functioning persists and no improvement in the joint and ear troubles has been observed. The case is one of incorrect treatment and cannot therefore be judged.

Of these 7 cases *16 and 39* are left out of account as the causes lie quite outside the dental sphere. It was clearly a question of serious trigeminal neuralgia in these cases.

Cases 21 and 46 may also be disregarded, as nothing was done and no change in status was noticeable.

Cases 31 and 40 are more puzzling, as the symptoms spontaneously and imperceptibly disappeared. In the latter case it is conceivable that the joint accommodated itself to the new loading conditions that prevailed on removal of the — 6.

Case 3 might be accounted for by trigeminal neuralgia the fact remaining, however, that the TM trouble with crepitation, tenderness, aching, difficulty in opening and deviation of the median line all disappeared after chiropractor treatment, although the neuralgia remained, but possibly somewhat improved.

The bite and joint types present were:

Case	*Bite*	*Joint*
3	N	Dj
16	N	N
21	PN	Dj
31	E Dj	Dj
39	N	Dj
40	N	N
46	no details	N

General discussion.

(1) *The radiograph of the temporo-mandibular joint generally gives clear indication of whether a malposition of the mandible exists on biting together in centric occlusion.* When such malposition occurs through "gliding obstruction" the X-ray control is a good aid in diagnosis. A careful study of the conditions in the mouth and an analysis of the bite in the articulator should of course supplement the radiograph.

The mode of procedure is the following:

Radiographs are taken of the two TM joints in habitual centric occlusion and in the relaxed (physiologic) rest position. If one condyle in the former position is more mesially situated than the other (Fig. 9), this, the author's experience has shown, provides a reliable indication that a gliding obstruction exists and a deviation of the median line of the mandible can then also be found.

(2) If there are difficulties in fixing the correct vertical dimension in one instance, as for example, case 46, the radiograph provides very reliable guidance since the condyle assumes its correct position in the fossa only where the correct physiological vertical dimension exists.

(3) When it is a question of determining the extent to which the bite is to be raised in a reconstruction the radiograph will again be of assistance, and for the same reason.

(4) Whether or not this increase in the vertical dimension will be followed by a sagittal displacement of the mandible depends, as pointed out above, on whether a *genuine deep bite* or *sunken bite* is present; the radiograph of the joint can again prove a valuable guide. (Fig. 10 and 12.)

Indeed, even at this early stage of the examination it renders possible a reliable differential diagnosis of the case, which, in its turn can determine the treatment and prognosis.

If the bite is sunken and the radiograph shows a distal position of the condyle in the fossa, the bite is raised just enough for the condyles to assume a physiologic and symmetric position in their fossae (Fig. 10).

(5) For the diagnosis and suggested therapy in the so-called temporo-mandibular arthroses the radiograph has also proved of great importance.

On all those occasions when a disturbance of the opening mechanism of the mandible is a part of the arthrosis complex the TM X-ray check is of outstanding value.

Although still too little is known about those changes that take place within the joint mechanism, the X-ray picture renders possible an indirect formulation of very important conclusions.

For that reason the author has devoted no attention to such changes in the hard tissues as deformations of the capitulum, the tuberculum articulare, etc. which of course are clearly depicted. Instead those changes of the disc have been considered that are not *directly* represented on the radiograph.

An increase in the normal width of the space between the condyle and fossa, points to an acute or chronic thickening of the cartilage, depending on how long the symptoms from the joint in question have lasted. (Fig. 2.) The width should not be expressed in millimetres as is so commonly the case in the literature; but a comparison with that on the normal side will give sufficient guidance for the diagnosis. A decrease in the width might be seen as a compression of the disc due to abnormally heavy loading (often due to malocclusion). If this overloading is more acute (trauma through an accident for example) the prognosis is relatively good. If on the other hand it is more chronic, most frequently due to disturbance in articulation over a long period, degenerative processes of the disc cartilage may occur that will be difficult to restore.

Folding or rupture of the disc are difficult to recognize on the radiograph, but on account of the restricted mobility of the condyle of the joint in question some inferences may be drawn as an aid to the understanding and planning of the treatment.

Results.

The results of the investigation summarized here are concerned only with the strictly dental causes.

The 58 cases comprised nearly four times as many women as men (45 to 13). The age ranges were 16—68 for women and 17—55 for the men, with the distribution shown in the table on page 3.

Striking points about the case series are: that a complete and established positive result was obtained in all the cases where

a direct dental origin could be shown (Total 40 cases). There are first the cases where malpositioning of the lower jaw occurred through faulty occlusion, *i. e.* where a deviation of the median line of the lower jaw occurred in habitual centric occlusion. Lateral displacement of the mandible is far more common than distal displacement, both in this limited case series (total 18 cases) and among the whole of the author's clientele. These were distributed as follows:

12 cases were treated with permanent bridges in connection with correction of occlusion.

6 cases were treated exclusively by spot-grinding (1 case with simultaneous focal infection is excluded).

In addition to these there are the cases without deviation of the median line:

14 treated with permanent bridges.

1 supplied with temporary splints (3 cases with complicated symptoms have been excluded).

13 cases were treated only symptomatologically — with heat, diathermy, short wave or similar therapy and as much rest for the joint as was possible (easily masticated food with liquids for the first days). Caution against wide and heavy biting.

7 of these cases did not present deviation of the median line on biting together in HC. Treatment yielded a positive result in all cases. Of two of these, occlusal trauma was found in one case and a fractured mandible through an accident in the other. In the remaining cases, the trouble must be attributed to the disc. In all the remaining 6 cases in this group a deviation of the lower jaw was associated with the opening movement. Of these, 2 gave a completely positive result, and 2 an obvious improvement after heat treatment, while the last two cases gave no results. Here it was clear that other causes, general disorders of the joints and severe neuralgia existed.

In 7 cases no dental treatment was given at all and they could therefore not be included here.

Of the total of 50 treated cases with disorders of the temporo-mandibular joints, 42 responded with completely satisfactory results. Purely dental origins were therefore responsible.

In 4 cases the clinical picture was dominated by quite different causes so that attempts at dental therapy yielded no result.

In 4 cases dental therapy resulted in an obvious improvement.

Conclusions.

In those cases of arthrosis of the temporo-mandibular joint where dental causes could be established, such as, for example, incorrect cuspal guidance of the lower jaw — either laterally or sagittally — it is reasonable, if this is diagnosed through bite analysis and X-ray of the temporo-mandibular joint and then corrected, to expect a disappearance of the disorder and a permanent cure.

In those cases where no definite dental origin could be established but where instead neuralgic symptoms dominated the picture, one cannot expect any improvement through dental therapy.

Symptomatic heat treatment and rest may yield satisfactory results in such cases, while in others, a radical neurosurgical approach might be required in order to relieve the patient of frequently severe pain.

In those cases where a dental origin can be established with certainty, three possible modes of treatment are open to consideration.

1. The mandible may be returned to its correct central position by spot-grinding, when existing obstructions to gliding are removed and smooth articulation obtained.

2. If the bite at the same time requires reconstruction this can be effected with permanent prosthetic appliances — fixed or removable —, or a combination of the two types.

Both these alternatives can be expected to yield lasting results.

3. The third possibility is to bring the mandible into the correct position with temporary splints alone, and to retain it there until such time as the symptoms have disappeared. As far as the third method of treatment is concerned the author is unable to pronounce a judgement since, as pointed out above, on account of the selective nature of the case series, such treatment was resorted to only in exceptional cases. Furthermore it was only applied in cases where it was quite uncertain from the start whether dental therapy had any chance at all of success.

Key to the survey table:

Type of joint:

N = normal
Fl = shallow
Dj = deep

L = lower jaw
U = upper jaw
r = right
l = left
rc = right condyle
c = left condyle
occl = occlusion
mast = mastication
ling = lingual(ly)
dist = distal(ly)
ivd = increase of vertical dimension in mm
tub. art. = tuberculum articulare
2 Li = width of 2 lower incisors
HC = habitual centric occlusion
RP = rest position

Type of occlusion:

N = normal, where HI and VI are normal
HI = } see below
VI = }
Dj = deep {where HI is normal and VI = 3—6 mm
E Dj = extr. deep {where HI is normal or less and VI = 6 mm +

PN = post-normal: HI = 3—6 mm
EPN = extr. post-normal: HI = 6 mm +
K = edge to edge
Pg = genuine progenic
HPg = habitual progenic
ÖB = open bite
AB = abrasion

HI = {horizontal / incisive / relation} {normal = 0—3 mm; postnormal = 3—6 mm; extr. » = 6 mm +}

VI = {vertical / incisive / relation} {normal = 0—3 mm; deep = 3—6 mm; extr. deep = 6 mm +}

In the X-ray column:

H = right condyle in habitual centric occlusion
V = left » » » » »
HX = right » » rest position
VX = left » » » »
HP = right condyle open position, 2 cm
VP = left » » » » »

Beitrag zum Verständnis der Ursachenkomplexe der Kieferbeschwerden, und die Bedeutung der Röntgenaufnahmen des Kiefergelenks für ihre Diagnose und Therapie.

Problemestellungen.

Im folgenden wird über eine Untersuchung berichtet, die durchgeführt wurde, um teils wenn möglich in den bisher recht unklaren Ursachenkomplexen der Kieferbeschwerden Klarheit zu gewinnen, teils um die Bedeutung des Röntgenogrammes des Kiefergelenkes für Diagnose und Therapie zu erforschen.

Das Material der Untersuchungen.

Das Material bestand aus meinem eigenen Klientel, sowie aus Patienten, die zur Diagnose und zum Vorschlag einer Behandlung an mich remittiert wurden.

Hier möchte ich darauf hinweisen, dass schon in dem Remittieren an mich zur Spezialistenbehandlung, eine Selektion vorliegt, wodurch der Schwierigkeitsgrad der Fälle in diesem Material bedeutend grösser sein muss, als bei dem durchschnittlichen Klientel, das in einer allgemeinen Praxis vorkommt. So kommen z. Bsp. bei diesem Material Tiefbiss sowie schwerere Bissanomalien in bedeutend grösserem Prozent vor als es sonst üblich ist. Hierzu kommt, dass Kieferbeschwerden und Störungen in der Artikulation bei diesen Fällen der Remisse zu Grunde lagen.

Folgende Auslese des Patientenmaterials wurde vorgenommen:

1) Nur solche Fälle wurden berücksichtigt, wo eine Röntgenkontrolle des Kiefergelenks vorgenommen worden war; ungefähr 300 Fälle.

Nur in reinen Ausnahmefällen kamen Gebissanalyse mit in individuell justierbaren Artikulatoren einmontierten Studienmodellen nicht vor.

2) Weiterhin kamen für diese Untersuchung nur soche Fälle in Frage, wo es sich entweder durch eigene Beobachtungen des Patienten oder bei der Untersuchung desselben herausgestellt hat, dass er Symptome von entweder dem einen oder von beiden Kiefergelenken hatte — in allem 83 Fälle.

3) Da dieses Material einen Zeitraum von 18 Jahren umfasst, war es bei dem Kontrollieren leider umöglich, sämtliche zu erreichen — einige Patienten waren verstorben, andere waren nach einem unbekannten Ort umgezogen u. s. w. Dadurch wurde das Untersuchungsmaterial weiterhin beschnitten bis zu im ganzen 58 vollständig kontrollierten Fällen.

Resultate.

Die Untersuchungsresultate, die hier berichtet werden, nehmen natürlich nur auf rein dentale Ursachenkomplexe Rücksicht.

Auf das, was schon einleitungsweise über die Auslese dieses Patientenmaterials hervorgehoben wurde, hinweisend, geht zunächst hervor:

1) dass Frauen in fast 4 mal so vielen Fällen vorkamen wie Männer (45 gegen 13).

2) die Altersgrenzen lagen zwischen 16—68 Jahren für Frauen und zwischen 17—55 Jahren für Männer, verteilt wie früher angegeben wurde. Siehe Tabelle Seite 3.

Auffallend bei dem untersuchten Material ist folgendes:

Ein vollständiges und positives Resultat wurde in all den Fällen erreicht, wo eine direkte dentale Ursache festgestellt werden konnte (Summa 40 Fälle). Wir haben da zunächst alle Fälle, wo eine Fehlstellung des Unterkiefers auf Grund einer unrichtigen Artikulation entstanden ist, d. h. wo eine Deviation der Medianlinie des Unterkiefers bei habitueller Centralokklusion vorhanden gewesen ist. Summa 18 Fälle. Nicht nur hier sondern auch bei meinem ganzen Patientenmaterial, ist die Schrägverschiebung des Unterkiefers auf Grund der Kuspenführung die ohne Zweifel häufigst auftretende Artikulationsstörung im Vergleich mit den Fällen wo eine reine Distalverschiebung des Unterkiefers vorhanden war. Diese 18 Fälle verteilen sich folgendermassen:

12 Fälle bekamen permanente Brücken gleichzeitig als das Korrigieren des Gebisses durchgeführt wurde.

6 Fälle wurden ausschliessend durch Schleifen des Gebisses behandelt. (1 Fall wurde ausgeschaltet, da gleichzeitig eine Fokalinfektion vorlag.)

Hierzu kommen ohne Deviation der Medianlinie:

14 Fälle, die bei der Behandlung permanente Brücken erhielten.

1 Fall mit temporären Schienen behandelt (3 Fälle mit komplizierten Symptomen wurden ausgeschaltet).

13 Fälle wurden nur symptomatologisch behandelt mit Wärme, Diathermie, Kurzwellen od. dergl. und ausserdem mit möglichst viel Ruhe für das Gelenk (die ersten Tage leicht zu kauende, sogar flüssige Nahrung etc.). Darauf achten, keine grosse oder feste Bissen zu kauen.

7 dieser Fälle wiesen bei dem Zusammenbeissen in habitueller Zentralokklusion keine Deviation der Medianlinie auf. Für alle diese Fälle gab die Behandlung ein positives Resultat. In zweien dieser Fälle konnte ein Okklusionstrauma nachgewiesen werden, und in einem Fall lag die Fraktur der Mandibel durch einen Unfall vor. Bei den Übrigen müssen Gelenkstörungen im Discus articularis die einzige Ursache gewesen sein. Von den restierenden

6 Fällen dieser Gruppe traf bei sämtlichen Patienten bei der Öffnungsbewegung eine Deviation ein. Von diesem gaben zwei ein vollständig positives Resultat, zwei eine wesentliche Besserung nach der Wärmebehandlung, während die übrigen zwei Fälle ein negatives Resultat gaben. Hier lagen wahrscheinlich andere Ursachen vor, generelle Gelenkstörungen und schwere Neuralgien.

In 7 Fällen kam eine dentale Behandlung gar nicht in Frage und dürfen somit nicht in diesem Zusammenhang mitgerechnet werden.

Von insgesamt 50 behandelten Fällen mit Kiefergelenkstörungen gaben folglich 42 ein bestimmt positives Resultat. Hier haben auch rein dentale Ursachen zu Grunde gelegen.

In 4 Fällen haben ganz andere Ursachenkomplexe das klinische Bild dominiert, und hier haben auch die Versuche mit dentaler Therapie kein Resultat gegeben.

In 4 Fällen schliesslich gab die dentale Therapie eine ausgesprochene Besserung.

Schlussfolgerungen.

Wenn man auf Grund der Untersuchungen dieses Patientenmateriales es wagen würde, einige Folgerungen betreffend der Etiologie, dem klinischen Bilde und der Behandlung der sog. Kiefergelenk-Arthrosen zu schliessen, könnten folgende Tatsachen angeführt werden.

In den Fällen von Kiefergelenk-Arthrosen, wo dentale Ursachen, wie z. B. ein fehlerhaftes Dirigieren des Unterkiefers auf Grund der Kuspenführung — entweder lateral oder sagittal — nachgewiesen werden können, kann man, wenn solche Verhältnisse durch Gebissanalyse und Röntgenaufnahmen des Kiefergelenks diagnostisch festgestellt und dann korrigiert werden können, ein Verschwinden der Kiefergelenkbeschwerden, und ein bestehendes Resultat erwarten.

In den Fällen dagegen, wo keine bestimmte dentale Ursachen nachgewiesen werden können, wo im Gegenteil die neuralgischen Symptome das Krankheitsbild dominieren, darf man durch eine dentale Therapie keine Besserung erwarten.

Symptomatische Wärmebehandlung und Ruhe können hier unter Umständen erfolgreich wirken, während in anderen Fällen sogar radikale neurochirurgische Eingriffe notwendig werden

können, um den Patienten von seinem oft schweren Leiden zu befreien.

In den Fällen, wo eine dentale Ursache mit Sicherheit festgestellt werden konnte, kann man sich für die Therapie drei Alternative denken:

1) Der Unterkiefer kann durch Einschleifen, wobei befindliche Gleithindernisse beseitigt werden und ein Artikulationsgleichgewicht hergestellt wird, wieder in seine richtige Zentrallage zurückgeführt werden.

2) Wenn der Biss gleichzeitig rekonstruiert werden muss, kann dieses durch permanente Prothesen, feste oder abnehmbare, oder durch eine Kombination beider Arten, geschehen.

Bei beiden Alternativen darf man auf ein dauerhaftes Resultat hoffen.

3) Die dritte Möglichkeit besteht darin, dass man ausschliesslich durch temporäre Biss-Schienen den Unterkiefer in die richtige Lage bringt, und ihn kürzere oder längere Zeit dort hält bis die Symptome verschwunden sind.

Was das Resultat dieser dritten Behandlungsmethode betrifft, möchte ich mich nicht mit Sicherheit äussern, da auf grund der von mir erwähnten Selektion des Patientenmaterials für diese Untersuchung, eine solche Behandlung nur ausnahmsweise vorgenommen wurde.

Ausserdem wurde sie nur in solchen Fällen vorgenommen, wo es von vorne herein ungewiss war, ob überhaupt eine dentale Therapie Aussichten habe, zu gelingen.

Contribution à la connaissance des causes des troubles de l'articulation temporo-maxillaire et valeur de la technique radiologique dans leur diagnostic et leur thérapie.

Les données du problème.

Compte rendu d'une investigation entreprise pour mettre en évidence les causes, jusqu'à présent restées assez obscures, des troubles de l'articulation temporo-maxillaire, et établir l'importance des radiographies de cette articulation pour le diagnostic et le traitement.

Observations.

La série de cas étudiés a été composée des patients de la clientèle privée de l'auteur et aussi de ceux qui lui furent confiés pour un diagnostic et un avis thérapeutique.

Il faut bien faire remarquer que, le fait même que ces patients aient été soumis à l'examen d'un spécialiste, implique que le degré de gravité de ces cas était considérablement plus élevé que celui de la clientèle moyenne d'un practicien ordinaire. Dans ces observations il y a un pourcentage plus élevé que normalement de troubles de la mastication par exemple, et de défauts graves de l'articulé dentaire. De plus, les troubles temporo-maxillaires et les troubles de l'articulation furent probablement la raison pour laquelle ces cas furent envoyés.

La discrimination suivante a été faite parmi ces observations:

1) Seuls furent acceptés les cas pour lesquels un examen radiologique avait été fait dès le début. Ces cas s'élèvent à trois cents environ.

L'analyse de l'occlusion dentaire, grâce à des moulages réalisés à l'aide d'appareils articulés, réglés individuellement pour chaque patient, a été faite dans tous les cas sauf quelques cas exceptionnels.

2) De ces trois cents cas, seuls furent inclus dans cette investigation ceux dans lesquels les patients ont personnellement sollicité un avis, ou ceux qui présentèrent à l'examen des symptômes localisés à l'une ou aux deux articulations, en tout 83 cas.

3) Comme cette série de cas s'étend sur une période d'environ dix-huit ans, il n'a pas été possible malheureusement de les examiner tous à nouveau et d'obtenir des renseignements à leur sujet; quelques uns ont déménagé, d'autres sont morts, etc. De ce fait le nombre des cas examinés se réduit à 58, tous pleinement contrôlés.

Résultats.

Les résultats de l'investigation résumée ici se rapportent uniquement à des causes d'ordre purement dentaire.

Ces 58 cas comprenaient presque quatre fois plus de femmes que d'hommes (45 cas pour 13). Les âges s'échelonnant de 16 à 68 ans pour les femmes, et de 17 à 55 pour les hommes avec la répartition indiquée par le tableau page 3.

Les points frappants chez les sujets examinés sont qu'un résultat positif, complet et définitif, a été obtenu dans tous les cas où une cause dentaire certaine a pu être mise en évidence (40 cas au total). Il y a premièrement les cas où une position défectueuse du maxillaire inférieur se produit par suite d'une occlusion vicieuse, c'est à dire quand la ligne médiane du maxillaire inférieur subit une déviation latérale dans le mouvement d'occlusion centrale. Ce déplacement latéral de la mâchoire inférieure est beaucoup plus fréquent qu'un déplacement distal; tous deux considérés dans ce nombre de cas limité, et dans toute la clientèle de l'auteur — 18 cas au total, répartis comme suit:

12 cas ont été traités par des bridges permanents conjointement à la correction de l'occlusion.

6 cas ont été traités exclusivement par meulage des dents (1 cas avec infection focale simultanée a été exclus).

De plus il y a les cas sans déplacement latéral:

14 cas traités par des bridges permanents.

1 cas traité par des attelles temporaires.

(3 cas avec des symptômes compliqués sont exclus.)

13 cas ont reçu simplement un traitement symptomatique: chaleur, diathermie, onde courte ou traitement similaire, repos aussi complet que possible de l'articulation (nourriture facile à mastiquer, liquides les premiers jours). Eviter une mastication ample et forte.

7 de ces cas n'ont pas présenté de déviation de la ligne médiane en serrant les dents au cours de l'occlusion centrale habituelle. Dans tous les cas le traitement a donné un résultat positif. Deux de ces cas ont été consécutifs l'un à un trauma d'occlusion, l'autre à une fracture de la mandibule.

Dans les cas restants, les troubles doivent être attribués au ménisque. Dans les 6 autres cas du même groupe une déviation de la mâchoire inférieure était associée au mouvement d'ouverture. Parmi ceux-ci, 2 ont donné un résultat entièrement positif, et deux une amélioration considérable après traitement par la chaleur, tandis que les deux derniers cas sont restés sans résultat. Ici il était évident que d'autres causes existaient: troubles généraux des articulations et névralgie grave.

Dans 7 cas aucun traitement dentaire ne fut donné, c'est pourquoi ils ne peuvent figurer dans ce rapport.

De l'ensemble des 50 cas traités pour des troubles articulaires temporo-maxillaires 42 ont donné des résultats pleinement satis-

faisants. Des causes d'ordre purement dentaire étaient donc à l'origine de ces troubles.

Dans 4 cas le tableau clinique a été dominé par des causes tout à fait différentes, si bien que les essais de traitement odontologique sont restés sans résultat.

Dans 4 cas ce même traitement a donné une amélioration considérable.

Conclusions.

Dans les cas d'arthrose temporo-maxillaire où des causes dentaires ont pu être mises en évidence, comme par exemple un trouble de direction dans le jeu de l'articulation, soit latéralement, soit sagittalement, il est raisonnable, si le diagnostic a été fait par analyse de l'articulé dentaire et examen radiologique de l'articulation temporo-maxillaire, et si ces troubles ont été corrigés, d'attendre la disparition des symptômes et une guérison permanente.

Dans les cas où aucune cause dentaire définie n'a pu être relevée, mais où par contre des symptômes névralgiques dominent le tableau, on ne peut espérer aucune amélioration par un traitement odontologique.

Un traitement symptomatique par la chaleur et le repos peut donner dans certains de ces cas des résultats satisfaisants alors que d'autres vont nécessiter une cure neuro-chirurgicale pour délivrer le patient de douleurs souvent sévères.

Dans les cas où une cause dentaire peut être mise en évidence avec certitude, trois modes de traitement possibles sont à retenir:

1) La mâchoire peut être replacée dans une position médiane correcte par meulage de la denture, ce qui fait ainsi disparaître les difficultés de glissement et facilite une articulation souple.

2) Si l'articulé dentaire nécessite en même temps une reconstruction, celle-ci peut être réalisée grâce à des appareils de prothèse permanents, fixes ou mobiles, ou combinant ces deux types.

On peut attendre de ces deux alternatives des résultats durables.

3) La troisième possibilité est d'amener la mâchoire dans une position correcte au moyen d'attelles temporaires, et de garder ainsi la mandibule en bonne place jusqu'à ce que les symptômes soient disparus.

Sur l'efficacité de cette troisième méthode l'auteur n'est pas en mesure de se prononcer puisque, comme il a été dit plus haut,

ce traitement n'a été mis en œuvre que dans des cas exceptionnels en raison de la sélection rigoureuse qui a été faite parmi ces observations. En outre, elle n'a été appliquée que dans les cas où il était très incertain au départ de savoir si un traitement odontologique aurait quelque chance de succès.

References.

LINDBLOM, G. (1935): Balanced occlusion. Dent. Cosmos, *75*, 973, 1063, 1197.

— (1936): Technique for roentgenphotographic registration of the different condyle positions in the temporo-mandibular joint. Dent. Cosmos, *78*, 1227.

— (1939): The importance of balanced occlusion. Dent. Rec., *59*, 1.

— (1942): A case of deep bite with unusual tendency to recidivation. Svensk Tandläkare-Tidskr., *35*, 309.

— (1946): I S:ta Appollonias Våld. Nordiska Bokh., Stockholm.

— (1948): The significance of bite analysis in modern dentistry. Dent. Rec., *68*, 254.

— (1949): The term "balanced occlusion". Dent. Rec., *69*, 304.

— (1950): The value of bite analysis in modern dentistry. Parts I & II. Brit. Dent. Jour., *89*, 87.

— (1951): Balanced occlusion with partial reconstructions. Inter. Dent. Jour., *1*, No. 3.

— (1951): A contribution to the knowledge of the causes of disorders of the temporo-mandibular joint and the value of X-ray technique in their diagnosis and therapy.[1] Svensk Tandläkare-Tidskr. *44*, 459.

BOMAN, LINDBLOM & SUNDBERG (1943): Arthrosis of the temporo-mandibular joint: its treatment by surgery and dental orthopedics.[1] Svensk Tandläkare-Tidskr. *36*, 441.

[1] Text in Swedish with English summary.

Address:
Sturegatan 32,
Stockholm, Sweden.