

## LATE RESULTS OF OPERATION FOR CONGENITAL TORTICOLLIS<sup>1)</sup>

BY  
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Dr. *Guildal* has been kind enough to leave the subsequent examination of the cases of congenital torticollis operated on at the Orthopaedic Hospital in Copenhagen to me.

It is the results of these examinations I have the honour to present here.

From 1920 to January 1st, 1936 the total number of patients operated on was 131. Of these patients 117 have been examined later. The number of patients not yet examined only amounts to 14 (12 %); some of these 14 patients were examined a few months after operation, and from the condition of the remainder on their discharge from hospital, there is no reason to think that a subsequent examination would alter the present statistical report. May I make a few remarks about the clinical material, which may help you to judge the operative results.

The great majority of the patients, namely 111, were operated on at an early age, 19 being under 5 years old. Only a few were under 3 years of age, 54 were between 5 and 10 years old, and 38 were between 10 and 15 years old. Only 6 were adults.

As in most other statistical reports the defect was more frequent among the female sex, in the present cases 50 boys as against 67 girls.

As has also been stated in other publications the defect is

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<sup>1)</sup> Read before the British orthopaedic Ass., May 18th, 1937.

mostly right-sided, namely 65 right-sided cases as against 52 left-sided cases.

The degree of the defect previous to the operation was classified as follows:

Minor degree .....	8
Intermediate degree—not complex .....	59
Major degree, complex form .....	41
Post operative recurrences .....	9

This series shows some interesting clinical points such as:

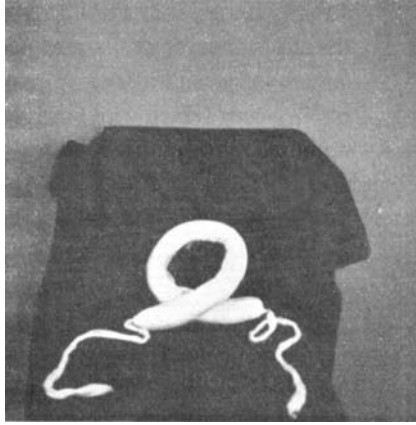
The importance of trauma at birth, the occurrence of several other cases in the same family and the simultaneous existence of other deformities and defects, which, however, I will not dwell on here.

Apart from the patients who have been admitted to the hospital with recurrence after the operation a few have for some time undergone the conservative treatment of manipulation, massage, and suspension. The majority, however, have received no treatment.

General anesthesia (ether) was always employed. In principle the operation was the same in all cases, with, however, a few modifications. The fundamental idea of the operation is an open tenotomy of the sterno-mastoid muscle corresponding to the seat of the contracture. The technique was as follows:

Through a horizontal incision 2 or 3 cm. long placed over the medial part of the sternal and clavicular heads of the sterno-cleido-mastoid muscle the muscles were exposed and cut in layers together with all tense fascial tissue, the patient's head being held in an over-corrected position to the sound side. Great stress is laid on the utmost thoroughness, especially in the sufficiently lateral loosening of the fibrous elements. The fascia which separates the back of the sterno-cleido-mastoid muscle and the internal jugular vein was also slit so as to bare the vein at the bottom of the wound.

After a careful hemostasis the skin is sutured with hemp or silk. The deformity is then over-corrected, the head being bent to the sound side, and turned to the defective side and then held there by means of *Schanz'* collar. Care is taken that



*Fig. 1.*  
Schanz' collar.

the over-correction is maintained until the patient is discharged from the hospital. The patient is then instructed as an after-treatment to use the inclined suspension apparatus at home a couple of times a day—a procedure that is to be continued for half a year, a year, or two years according to the circumstances in order to ensure a permanent result.



*Fig. 2.*  
Super-correction of the head with Schanz' collar.  
(After operation for right-sided torticollis.)

In some cases the operative technique was, as before mentioned, modified. In a few severe cases where the muscles had to a great extent undergone fibrous degeneration a resection of the muscles in question was made. In a single case superior tenotomy was also undertaken. In the case of a great many



*Fig. 3.*

After-treatment with inclined suspension.  
(After operation for right-sided torticollis.)

patients, a total number of 56, mainly girls (where the defect was not too serious), the operation was supplemented by a plastic lengthening of the muscle that was cut, and a corner of muscle was sewn down to one of the places of insertion to prevent a possible obliteration of the contours of the neck.

The post operative period of observation was between 1 and 16 years, on an average 5 or 6 years. The great majority of the

patients I examined personally but, as we did not want to incommode the patients from the provinces by requesting them to come to the hospital these were examined by their physicians according to a printed form, in which several definite questions required to be answered. I want to thank these physicians for their kind assistance.

*Operation result of 117 cases (including 9 operations for recurrence).*

*Mortality:* 0.

*Complications:* An injury of the internal jugular vein occurred twice but was attended by no consequences to speak of, neither serious bleeding nor air-emboli. The injuries were repaired by side-ligature or suture. In 3 cases there was a slight suppuration of the wound.

*The immediate result of the operation* has with a single exception been satisfactory, with a good correction or over-correction of the head at the patient's discharge from the hospital 2 or 3 weeks after the operation.

In judging the *permanence of the result* the following objective and subjective factors have been taken into account, although in a varying degree.

*Objective factors:*

*Subjective factors:*

Position and movability of the head.

Patient's estimate of the cosmetic and functional result.

The contracture.

Face asymmetry.

Vertebral deformities.

The scar.

The contours of the neck.

I have divided the results into three categories:

I. good.

II. less good, not satisfactory.

III. recurrent.

None of the cases were worse than before operation.

*Group I: good result.* To this group belong in the first place not only the cases that are *quite ideal* in every respect, but also

cases where the cosmetic and functional results are good, even though they leave something to be desired in anatomic respects. More clearly defined, these are patients with an erect bearing of the head and neck, with free movability of the head and the neck, with no face asymmetry or, with one so slight as to be scarcely perceptible, with no vertebral deformities, with a scar that is at any rate not disfiguring, where the contours of the neck do not differ greatly from the normal, and, where at the same time the patient himself is satisfied. With some of these patients there is a slight contracture of the muscle operated on, most easily seen when the head is turned vigorously to the one side. This, practically speaking, means nothing to the patient who as a rule is not even aware of it. To this category, fortunately, most patients belong, namely 100 (86 %) of whom 17 are quite ideal (15 %).

*Group II: less good result*, at any rate a little unsatisfactory from the operator's point of view, while the patient himself is as a rule so well satisfied that one is reluctant to suggest a re-operation, so that everything considered the situation has been considerably improved.

The classification of this group has been made according to the existence of one or more of the following symptoms:

An abnormal position of the head, either slightly bent to the defective side, or, possibly turned a little to the sound side. A recurrence of the contracture though less pronounced than before. A slight restriction in the movability of the head in any way. A persisting face asymmetry, possibly with some vertebral deformity. A disfiguring scar or keloid. A striking deviation from the normal in the contours of the neck. The after-examination shows that 13 patients (11 %) belong to this group. It must, however, be born in mind that the grouping was by no means an easy matter. Some of these patients might come under the group of the good results, conversely another examiner would possibly include some of the patients from group I in the group of the less good results.

*Group III: the material offers 4 examples (3 %) of recurrences.* None of these patients was—apart from the scar—worse off than before.

As a whole these results must, in consideration of the nature of the material, be said to be good, at least better than I had expected. At that time, to be sure, I was not familiar with any other reports of late results, and, hoping that it may be of interest I beg for the sake of comparison quite briefly to reproduce the literature I have been able to find on this subject.

*Nussbaum* (1926) has followed up 47 of a total number of 77 patients operated on by the Mikulicz method—either with total extirpation or resection of the sterno-cleido-mastoid muscle. The entire result is difficult to judge numerically, but it is stated that the main objects of the operation: the position and movability of the head were deficient in 24 % of the cases. The material is from Stich's ward in Göttingen.

A Swedish report (*Hellstadius*) (1927) of 23 cases operated either through open tenotomy at the insertion or by open tenotomy at the origin plus subcutan tenotomy downwards states that the results were on the whole good. Only 1 recurrence.

*Arnold* (1933) has followed up 51 patients from Klose's ward in Danzig of whom 14 were operated on after the Volkmann method, 37 after the Mikulicz method. There were no essential differences in the results after the two methods. Recurrence in 3 cases. As the cosmetic result was not quite satisfactory, these surgeons changed their technique and adopted the Lange and Tillaux method. The result of this was that out of a number of 9 patients recently operated on there was one case of recurrence, one middling good case, and seven good cases.

*A. Kramer* (1934) has after-examined 60 patients out of a total number of 149 patients operated on. Most of these patients were operated on after the Lorentz' Method: subcutan tenotomy, redressement, plaster of Paris cast for four weeks.

Result: The scar was fine in all cases. The contours of the neck were well-preserved in 72 %, partly preserved in 11 %, and effaced in 17 % of the cases. The functional result was very good in 83 %, good in 15 % and recurrent in 1,7 % of the cases.

In the following a few minor statistics are stated. The original works have not been available to me.

*F. Lange* (1914): 40 cases operated on after own method. 3 % recurrent.

*K. Hutten* (1926): 20 cases operated on after the Föderl method. 10 % recurrent.

*Doering* (1934): 37 cases (open tenotomy, redressment). 2.7 % recurrent.

*Howell*: 20 cases operated on after the Lorentz method. 5 % recurrent.

From this country *Bentzon* (1934) has published his results: 43 patients operated on at about the same age as ours. In the case of 33 patients double myo-tenotomy was undertaken, both at the origin and at the insertion, in 10 cases single myo-tenotomy at the insertion. The result is stated as being good and lasting in all cases except one, which was not so good.

*Hough* (1934) has published an American statistical report dealing with 35 cases, all children under 14 years of age, with an operative technique very similar to ours. He states that all the results were good.

In the same publication two older statements from about 1921 are quoted. I have not had access to the originals. One statement (*Meyerding*) comprises 26 cases operated through open tenotomy with the following results: 14 cured, 4 improved, 8 unaffected. The other statement (*Steindler*) gives the following late results of 27 patients operated on: 77 % good, 23 % bad.

I shall not attempt any comparison between the results of the various statistical reports and my own report, as very few have stated on what principles the results have been judged. However, there seems to me to be special reason to stress *Bentzon's* fine results. These are probably to some extent due to the fact that he deals with a private clientele, where the conditions for a consistent after-treatment are better than at a public hospital. At the Orthopaedic Hospital, at least, it is a fact that after-treatment of patients who have their homes in the provinces cannot be dealt with by the hospital. It seems to me that this after-examination together with the other statistical reports provides good data for a judgment of the operation prognosis with regard to congenital torticollis.

No matter what the method employed a small per cent of recurrences is inevitable while in a number of other cases the result is not quite good, but in my opinion it is of value to have been able to ascertain that a good and lasting result may be reckoned with in about eighty cases out of a hundred.

As regards a comparison between the results of ordinary tenotomy and tenotomy plus plastic lengthening of the sternocleido-mastoid muscle, the after-examination shows that the results are practically the same. It does not appear that the contours of the neck in general are much better after plastic than after ordinary tenotomy, neither do they appear to become worse, nor is the danger of recurrence greater.—However, as the patients who have received the plastic treatment have been specially selected, it seems to me that ordinary open tenotomy is to be preferred when there is a question of choosing between these two operations.

I have tried to find out if it is possible on the basis of this material to discover the reason why some cases recur or become less good. In some cases I think this has been possible. In order not to trouble you with an account of each patient, I beg quite briefly to state the factors which in my opinion are responsible for some of the unsatisfactory results.

1) *Recurrence after previous operation.* There is no doubt that such cases may be successfully operated on, among other things because the present material shows 6 good examples of this, but it seems obvious that there is less hope for a good result than in the case of patients not previously operated on. 3 of the unsatisfactory results are cases recurring after previous operation elsewhere.

2) *Age of patient operated on.* I have formerly been of the opinion, perhaps shared by others, that the earlier one operated for torticollis—that is to say when the time for conservative treatment had been exceeded—the better the result that might be expected. This opinion is no doubt wrong, as a proper after-treatment cannot be given to children of say 2 years of age.

As a matter of fact 2 of the cases which recurred, that is to say half of them, were children of 2 years of age, the very

youngest operated on. Both of them were operated again later on with a good result. On the other hand the patient may also be too old for the operation. Among the older patients there are, to be sure, a few who have been operated on at the age of thirty or thereabouts with a good result, but it is surely not accidental that one of the oldest patients, a patient of 17 with severe complex torticollis, showed a less good result.

3) *Technical errors.* That lack of radicalism in the operative technique may be the cause of less good results is obvious. The material offers one definite example—and probably several other examples—of this, where no other cause can be found. This was a patient who at once got a recurrence because the clavicular head had not been cut.

4) *Deficient after-treatment.* Whether the permanent result can be good or not without proper treatment cannot be seen from the present material. All patients with a satisfactory result have, as a matter of fact, paid good attention to their after-treatment. I am of the opinion that the after-treatment is of the greatest importance for the good result of the operation. I am supported in this opinion by the fact that 4 patients with unsatisfactory results had either not at all or only for a short period complied with the request to practise suspension.

5) *Keloid in the scar* has impaired the result in the case of 2 patients.

With regard to the 4 last patients included in this material the cause of the less good result cannot be seen. Two of them were, to be sure, strongly pronounced and complex cases, one of them even to such a degree that superior tenotomy had to be undertaken.

The factors of importance for obtaining a good permanent result are in my opinion the following:

1) Great thoroughness in the performance of the operation including the cutting of all tense tissue to the sides and down to the bottom, so that one does not finish until the internal jugular vein has been laid bare. Careful hemostasis.

2) *Age of patient operated on* should not be under 3 or 4 years.

- 3) Continued over-correction of the head during the stay at the hospital.
- 4) Careful and long after-treatment.

## SUMMARY

Of the 131 patients operated on 117 were after-examined.

*Method of operation:* Open tenotomy on the sternocleidomastoid muscle at its insertion, with—possible resection of the fibroid degenerate part of the muscle in question. In several cases the operation was supplemented by a plastic lengthening of the muscle.

*Time of operation:* 1—16 years. Average time: 5—6 years.

*Result of operation:* I. Good: 100 cases (86 %) of which  
17 cases were quite ideal.

II. Less good: 13 cases (11 %).

III. Recurrent: 4 cases (3 %).

The importance of the following points for the obtaining of a good permanent result is emphasized:

1. Extreme thoroughness in the performing of the operation.
2. Age at operation not under 3—4 years (and preferably not over 15—16 years).
3. Continuous over correction of the head while at the hospital.
4. Sedulously maintained and prolonged after-treatment.

## ZUSAMMENFASSUNG

Von 131 operierten Patienten wurden 117 nachuntersucht.

*Operationsmethode:* Offene Tenotomie am m. sterno-cleido-mastoideus an der Insertion — evtl. Resektion des betreffenden fibrös degenerierten Muskelabschnittes. In einem Teil der Fälle wurde die Operation durch plastische Verlängerung des Muskels suppliert.

Observationszeit: 1—16 Jahre, durchschnittlich 5—6 Jahre.

Operationsresultat: I. Gut: 100 Fälle (86 %), hiervon 17 Fälle ideell.

II. Weniger gut: 13 Fälle (11 %).

III. Rezidiv: 4 Fälle (3 %).

Als zur Erzielung eines guten Dauerresultates von Bedeutung ist hervorzuheben:

1. Weitgehender Radikalismus in der Ausführung der Operation.
2. Ein Operationsalter von nicht unter 3—4 Jahre.
3. Fortgesetzte Überkorrektion des Kopfes während als Hospitalsaufenthaltes.
4. Sorgsam durchgeführte, langdauernde Nachbehandlung.

### RÉSUMÉ

Parmi 131 malades opérés, 117 ont été soumis à un examen ultérieur.

*Méthode opératoire:* Ténotomie ouverte sur le muscle sterno-cleido-mastoïdeus, au point de l'insertion — éventuellement résection de la partie fibreuse dégénérée du muscle en question. Dans plusieurs cas l'opération a été supplée par un rallongement plastique du muscle.

*Durée de l'observation:* 1 à 16 ans, en moyenne 5 à 6 ans.

*Résultats de l'opération:* I. Bon: dans 100 cas (86 %), dont résultat idéal dans 17 cas.

II. Moins bon: 13 cas (11 %).

III. Récidive: 4 cas (3 %).

Parmi les faits qui présentent de l'importance pour l'obtention d'un bon résultat de durée, il est relevé:

1<sup>o</sup>) Radicalisme poussé dans l'exécution de l'opération.

2<sup>o</sup>) Age du malade opéré: pas inférieur à 3—4 ans (et pas supérieur à 15—16 ans).

3<sup>o</sup>) Surcorrection continuelle de la tête durant le séjour à l'hôpital.

4<sup>o</sup>) Traitement complémentaire extrêmement minutieux et de longue durée.

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