

ON THE TREATMENT OF ANTICRURA VARA RACHITICA

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In the Orthopedic Clinic at Stockholm, pseudarthrosis has appeared in the cases of two children, 3—4 years old, after osteotomy of the tibia performed for correction of rachitic curving of the legs. These cases are considered interesting enough to be published, and it will be appropriate, I think, in this connection to give a comparative survey of the large material of

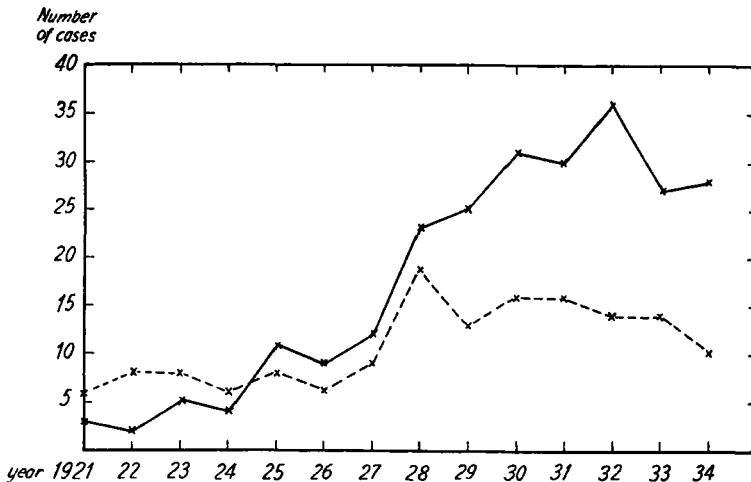


Fig. 1.

Graphical presentation of yearly distribution of cases under conservative treatment and under active treatment.

————— : Conservative treatment.
----- : Active

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anticrura vara rachitica of this institute, especially as no such material has been worked up in this country previously—as far as the author has been able to find out.

During the period of 1921—1934 altogether 421 cases of this deformity have been treated in this clinic. The curves presented in Fig. 1 show the distribution of these cases per year and the relation between the numbers under conservative treatment and those under active treatment.

Undoubtedly the steady rise in the number of cases per year is connected with the general increase in the number of patients consulting the orthopedic clinics. The conspicuous decrease in the number of active corrections as compared to cases under conservative treatment would undoubtedly be attributable chiefly to the gradually increasing restriction of the indications for operative treatment. In 65 % of the cases the therapy has been conservative; this applies to the relatively mild or moderate forms with very slight breaking or none at all. In these cases the patients have been supplied with a valgus plate in the shoe, and they have been instructed to reappear for control within a period of 6 months. But only 24 % have returned, and hence it is not practicable to give any survey of the therapeutic results. In view of the rather limited access to orthopedic special treatment elsewhere, it seems reasonable to take this strikingly low figure to suggest that the non-returning patients have shown such an improvement that further medical examination was considered unnecessary. As to the 64 reexamined cases, the results of the treatment are given in Table 1.

TABLE 1.
Results of Conservative Treatments (With Valgus Plate in Shoe).

	Im- proved	Straight	Unchanged
Reexamination after ½ year	21	2	6
» » ½—1 »	9	7	2
» » 1—1½ years	4	5	
» » 1½—2 »	2	1	
» » 2— »		5	

In 25 cases operative treatment was taken to be indicated but no operation was performed because the parents objected to it. Only one of these patients has later returned, and then he was found to have improved so much that there seemed no longer to be any particular reason for operative treatment. In 10 cases, which were subsequently given operative treatment, the patients were first treated conservatively for several months (up to one year) with very slight effect, or none at all.

From the findings above it seems evident that the rachitic curvatures of the legs have a pronounced tendency to straighten out more or less, and a contributory factor in this result, I think, is treatment with the proper sole-plate in the shoe, giving a more favorable distribution of the weight on the foot.

Consequently we have to limit the indications for active corrections therapy rather narrowly, comprising only cases with pronounced breaking of the bones which in all probability will not go on to spontaneous recovery, while they involve considerable static and cosmetic inconveniences.

Among the 152 cases in which surgical treatment was employed, these requirements of indication appear to have been met, at any rate, in the last quinquennium.

The methods of correction have consisted in bloodless manual osteoclasia and in combined osteotomy-osteoclasia. Fig. 2 shows the age of the patients at the time of the respective operations.

Osteoclasia was performed in 22 cases (bilateral in every case), and mostly in the first eight years of the aforementioned period—because, for some reason or other, the clientele has changed in character, and not because of any discredit to the method. On the contrary, according to general experiences the results are rather favorable. In none of these cases was there any complication that could be attributed to the operating measure, and the correction results have been good (the legs became perfectly straight in 19 cases, and there remained a slight varus curvature in 3).

In the remaining 130 cases, bilateral osteotomy and osteoclasia was performed. In this operation, subperiosteal transverse osteotomy of the tibia was performed at the level of the greatest

curvature of the leg, with chissel or, in a few cases, with Bayer's saw and finally osteoclasis of the fibula. Thus, in a majority of the cases the site of osteotomy falls within the lower half of the tibia. In 3 cases of very marked deformity, subcondylar osteotomy was performed; and in 4 cases a wedge-shaped sec-

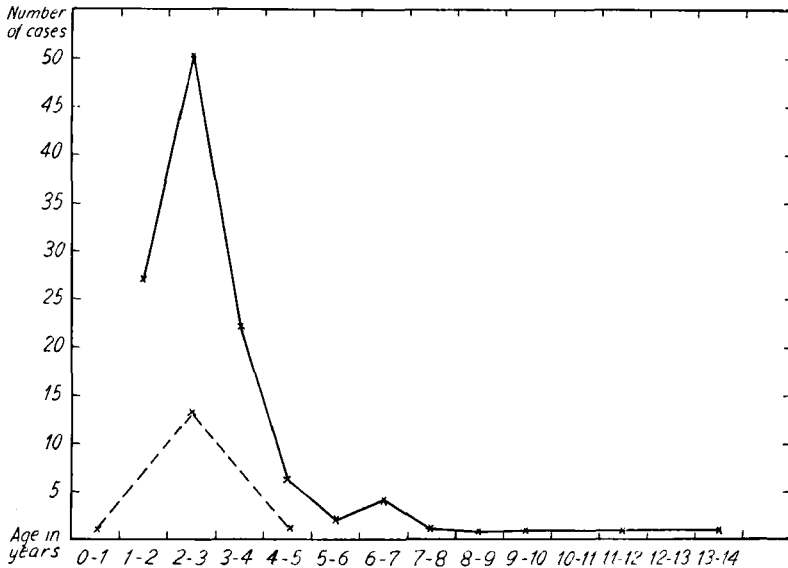


Fig. 2.

Age of patients at the time of operative treatment.

.....: Osteoclasis.

————: Osteotomy.

tion of the bone was resected in order to obtain a satisfactory correction.

In all these cases (*i.e.*, also after osteoclasis) the operation is followed by fixation of the leg in hip plaster or all-leg plaster for a period of 4—8 weeks, and then training in walking in the plasters and physical treatment commence. As is evident from Fig. 3, the total hospital period in the individual cases has been varying greatly, owing primarily to the frequent complications with ordinary intercurrent diseases of childhood.

The primary correction result after osteotomy has been good

in 119 cases; considerable deformities persisted in 4 cases. No information could be obtained afterwards in 6 cases. In one instance, the patient died of an intercurrent disease.

Complications: Wound infection was not seen in any instance; all the operating wounds healed primarily.

In one case, erysipelas appeared 2½ months after the op-

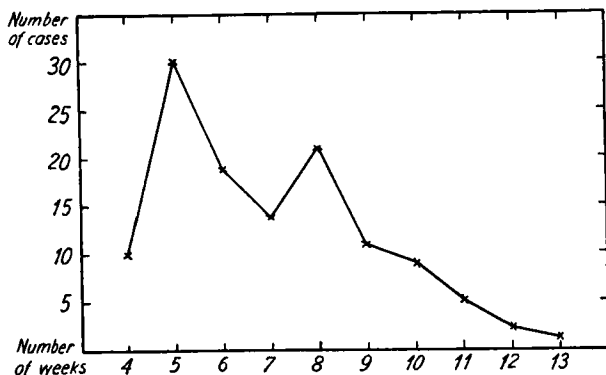


Fig. 3.

Total hospital period for cases under active treatment.

eration, and it was taken to have originated from the site of osteotomy, but it would not seem reasonable to enter this condition under the term »surgical infection«.

Decubital sores appeared in two cases, on the dorsum of the foot, from pressure of the plaster. These sores took a long time to heal (3 and 4 months, respectively), and in both cases the scar-formation gave rise to a faulty position of the foot which required a protracted correction and sole-plate treatment.

Relapse occurred in one case. The operation was performed at a rather high age (6½ years), and the patient was discharged after 7 weeks in hospital, with a removable plaster that was to be put on at night. It appears as if the parents failed to follow the instructions given at the discharge. The patient did not return until 9 years after the operation, and now there was a very marked relapse. A considerable improvement was now obtained after subcondylar osteotomy.

Finally, the healing of the bone did not proceed normally in 4 cases; 2 of these showed pseudarthrosis at the site of osteotomy. As the cases show some points of particular interest, a brief abstract of the case records is given here.

CASE 1.

S. G. J., born 12/5/26. Bottle-baby. Physical exam.: Moderate varus bending; supramalleolar breaks. 11/12/28: Bilateral osteotomy-osteoclasia. Hip plaster. 5/1/29: Replastering (all-leg plaster). 8/1: Walking exercise. 17/2: Discharge. (The long stay in hospital due to attack of whooping-cough). Legs straight.

12/4/29: A few days ago the patient fell and hurt himself. Now there is tenderness over the site of the osteotomy on the right leg, and this part of the bone feels wriggly. X-ray examine: Infraction. All-leg plaster. 4/5: Plaster removed. The patient fell again and hurt himself. No clinical dislocation. Plaster splint. 26/5: Clinical consolidation.

CASE 2.

K. B. W., born 25/1/32. Bow-legged since birth. Physical exam.: Slight varus curvature of the legs, with typical breaks. 5/10/34: Osteotomy-osteoclasia. Hip plaster. 9/11: Replastering (all-leg plaster). 14/11: Walking exercise in plasters. 22/11: Plaster removed. 30/11: The patient fell and hit her leg, which now feels wriggly. X-ray exam.: Infraction.

10/1/35: Plaster cut open. Clinical consolidation.

CASE 3.

M. K., born 19/5/25. Deformities since birth. Physical exam.: Slight varus curvature of both legs, with supramaleolar breaks. 5/10/28: Bilateral osteotomy-osteoclasia. Hip plaster. 17/10: Change of plaster (all-leg plaster). 29/10: Walking exercise in plasters.

10/12: Discharge. Operative result rather poor.

4/6/29: Pseudarthrosis of left leg at site of osteotomy. One

month before: Traumatic injury to the leg; since then, complaint of pain.

5/6: Correction of leg. All-leg plaster. 29/8: Resection of pseudarthrosis; insertion of tibial bridge. 26/1/32: Clinical consolidation. X-ray exam.: Persisting pseudarthrosis. The patient is supplied with an unjointed foot-casing.

CASE 4.

M. G., born 21/11/26. Physical exam.: Very marked degree of crura et anticrura vara, with a malleolar distance of 9 cm.; supramaleolar breaks.

9/7/29: Osteotomy-osteoclasia. Hip plaster. 6/8: Not complete consolidation. All-leg plasters. 21/8: Walking exercise. 5/9: Discharge. Good result of operation.

2/8/30: Suggestion of pseudarthrosis of the left leg. Hospital treatment advised.

27/8/31: Parents not returned with child till now. Pronounced break of the left leg corresponding to the site of osteotomy. 29/8: Correction of deformity by wedge-formed osteotomy at the site of pseudarthrosis. Plaster till 18/1/32, when there is clinical consolidation. X-ray exam.: Persistent pseudarthrosis. Unjointed foot-casing.

20/7/35: Leg straight and absolutely firmly consolidated.

Obviously the cases reported above show that osteotomy of the tibia in children involves a not unessential risk of refracturing at the site of osteotomy even at some length of time after the operation and, furthermore, that this kind of fractures have a tendency to go on to pseudarthrosis. Three of these cases give an indisputable history of traumatic injury, but in all three cases the injury was of such a mild character, that it seems fairly reasonable to assume that also the fourth patient may have been exposed to a similar injury without the parents observing it. In Case 2 the injury occurred already 8 weeks after the operation, and it seems quite conceivable that such a trauma

may give a refracture; indeed this result of the injury, I think, ought properly be regarded as an unlucky accident. It may be that the risk of this complication might have been avoided by extending the after-treatment for some weeks more.

In the three other cases, however, it is quite a different matter. Here the fractures make their appearance after 17 weeks (Case 1), 7 months (Case 3) and 13 months (Case 4), that is, after such a length of time that one would expect the healing of the bone to be so solid and reliable that an otherwise insignificant injury could cause refracturing. Here, then, there must have been some special factors to bring such a defective consolidation at the site of osteotomy even as long as one year after the operation—a *locus minoris resistentiæ*. As the curvatures here concerned generally are attributed to rickets, it seems rather obvious to look for the cause of the refracturing in a rachitic rebuilding process. This hypothesis finds support also in the fact that at the time of the osteotomy both Case 3 and Case 4 showed roentgenographic signs of rickets.

Further, it is also worth notice that in Case 3 the curvatures are said to have been present since birth, but—apart from the lack of value of such information in the anamnesis—neither the physical examination nor roentgenography revealed anything to suggest a congenital origin.

In Cases 3 and 4 we have thus a possible explanation of the defective consolidation in the circumstance that the osteotomy was performed in the presence of rickets. In Case 1, on the other hand, there appears no reasonable explanation—provided that the injury was of such a mild character as suggested by the case history—for the operation was performed in the usual manner, just like in all the other cases, and the after-treatment did not differ from the ordinary. The formation of pseudarthrosis in Cases 3 and 4 seems to be explainable by the fact that both these patients did not come under treatment until a considerable length of time after signs of fracture had been noticed; this applies in particular to Case 4, which was refractory to all therapy for the first year.

SUMMARY

Comparative survey is given of 421 cases of anticrura vara rachitica that were treated in the Orthopedic Clinic of Stockholm during the period of 1921—1934.

Conservative treatment was employed in 65 % of the cases. 24 % of these have been reexamined, and the result of the treatment has been favorable in most of these cases.

22 cases have been treated with bloodless osteoclasis. All these cases have taken an uncomplicated course, and the correction result has been satisfactory.

130 cases have been treated with combined osteotomy and osteoclasis. In 4 of these cases the healing of the bone was abnormal.

In 1 case there was a traumatic injury 8 weeks after the operation, resulting in infraction at site of osteotomy.

In 2 cases there was refracture respectively 7 and 13 months after the operation, which in both cases had been performed at a time when there were roentgenographic signs of persistent rickets. These 2 cases did not come under treatment again until a considerable length of time after the refracture, and they presented pseudarthrosis.

In 1 case a slight injury was associated with refracture 17 weeks after the operation. There is no satisfactory explanation of the defective healing of the bone.

RÉSUMÉ

Comparaison de 421 cas d'anticrura vara rachitica, traités à la Clinique orthopédique de Stockholm, durant les années 1921 à 1934.

Traitement conservateur dans 65 % des cas. Parmi ceux-ci, 24 % furent revus et dans la plupart d'entre eux on constata que les résultats du traitement étaient favorables. 22 cas avaient été traités par ostéoclasie sans épanchement de sang. Ils suivirent leur cours sans complication et les résultats de correction obtenus ont été satisfaisants.

130 cas furent traités par ostéotomie et ostéoclasie combinées. Parmi ceux-ci, on releva 4 cas avec guérison anormale de l'os.

Dans un cas, trauma 8 semaines après l'intervention et, par suite, fracture à l'endroit de l'ostéotomie.

Dans deux cas, nouvelle fracture 7 et 13 mois respectivement après l'opération, qui fut exécutée, dans tous les deux cas, à un moment où la radiographie montrait des signes prononcés de rachitisme. Ces deux cas furent mis en traitement assez longtemps après la nouvelle fracture et montraient alors des pseudarthroses.

Dans un cas, nouvelle fracture, 17 semaines après l'intervention, à la suite d'un léger trauma. Aucune explication à la guérison défectueuse de l'os.

ZUSAMMENFASSUNG

Zusammenstellung von 421 Fällen von anticrura vara rachitica, die während der Jahre 1921—1934 in der orthopädischen Klinik in Stockholm behandelt wurden.

Konservative Behandlung in 65 % der Fälle. 24 % dieser Fälle wurden nachuntersucht, und das Resultat der Behandlung war in der überwiegenden Anzahl der Fälle günstig.

22 Fälle wurden mit unblutiger Osteoklasie behandelt. Alle diese Fälle verliefen ohne Komplikationen, und das Korrektionsresultat war zufriedenstellend.

130 Fälle wurden mit kombinierter Osteotomie-Osteoklasie behandelt. Unter diesen waren 4 Fälle mit anormaler Knochenheilung.

In einem Falle Trauma 8 Wochen nach dem Eingriff und als Folge hiervon Infraktion der Osteotomiestelle.

In zwei Fällen Refraktierung 7, resp. 13 Monate nach der Operation, die in beiden Fällen zu einem Zeitpunkt ausgeführt wurde, als röntgenologische Zeichen einer fortdauernden Rachitis vorlagen. Diese beiden Fälle kamen absehbare Zeit nach

der Refrakturierung in Behandlung und boten damals das Bild einer Pseudoarthrosis dar.

In einem Falle Refrakturierung 17 Wochen nach dem Eingriff im Anschluss an ein leichtes Trauma. Keine Erklärung für die misslungene Knochenheilung.