Manual Osteoclasis

in the
treatment of deformities
due to
Rickets.

by

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Manual Osteoclasis in the treat-
ment of the various rectally
deformities of the ileus, has, of late
years, been almost entirely replaced
by Osteotomy— that it still, if
carefully carried out in properly
selected cases, is of great use in
the treatment of such deformities
is my belief, that the grounds
for this belief are well founded.

In my purpose to prove in this
communication.

Ricketts deformities form a large
proportion of the surgical prac-
tice of Children's Hospitals in
large towns— during my house
surgery for 72 months at the
Liverpool Children's Infirmary
no less than 121 patients were
operated on for rectal deformities,
besides these, a
great number were, of course,
treated by milder measures.

It is to the great kindness of
Mr. Murray, the Senior Surgeon there,
that I am indebted for allowing me to investigate these cases, to place on record the results of the treatment.

It is beyond the scope of this paper to enter into the history of disoclasis; this will be found fully detailed elsewhere, but especially in a paper on Disoclasis & the Disoclasis by Mr. Gantzi, of Lyons, where the treatment of Ricketsy deformities has received much attention.

Nor will it be necessary for me to describe the various deformities due to rickets. These, and their method of production are very fully described & figured in many works, notably in the "Diseases of Children" by Addison Wright. The method, which I shall presently endeavour to describe has been in use at the Liverpool Children's Infirmary for the past 5 years. The deformities for which it seems most applicable are:
1. Genu Valgum
2. Genu Varum, either separately, or combined with genu valgum
3. Avulsed fibula (tibialis), either antero-posterior, or lateral, or as is frequently the case, when they are combined.
4. Finally, but much more rarely across the ischium.

The accompanying photographs will serve partly to illustrate these.

The method usually practiced in manual osteoclasis, Deloe's method, and a subsequent modification of it by Tzallaux, has great objections to it, which I hope to shew are not applicable to that employed at Liverpool.

In Deloe's method - the patient suffering from knock knee, was placed near the edge of the bed of the limb rotated outwards so as to lie on the side; a cushion was placed
under the external malleolus; +
the knee thus raised above the
plane of the bed. — The surgeon
then pressed down on the inner
aspect of the knee with the
whole of his weight, until the
deformity was reduced.” (Douglas,
Edin. med. journal, April 1889).
The great objection to this procedure
lies in the fact, that it cannot
be in the least predicted, what
structures are torn, or what
amount of injury may be
done.
The method as practised in the treatment of genu
valgum in following cases is somewhat as
follows: — The patient having
been anaesthetized, is brought
near the edge of the table and
turned on to the side opposite to
the deformity — the surgeon
grasps the deformity thigh
with one hand, immediately
above the spot at which it
is intended to fracture the limb,
in such a manner that (as in the case of the right leg for instance) the thumb rests on the outer front aspect of the tibia - the index finger on about a corresponding position behind - the radial border of the hand being thus directed towards the knee joint on its inner aspect. With the other hand, the leg is grasped firmly about the junction of its lower middle third - with this lower hand force is applied inwards almost in a direction at right angles to the long axes of the femur, but with a slight inclination upwards - at the same time, a concentric acting force is made with the upper hand, - endeavoring by these means to exert our force in such a direction, that the lower tuberosity of the tibia is pressed against the elongated external condyle of the femur, and the chief strain being put upon...
the shortened & thickened structures at
the outer & back part of the joint.
That these structures are shortened;
may be easily demonstrated in
a case of genu valgum - on at-
tempting to straighten the limb
during extension - the tendon of
the biceps & ilio-tibial band
will become very tense.
Ed. Owen (in the Journal of Anat-
omy & Physiology 1879) says
in describing the anatomy of
thick knee: "The fascia lata
descending from the head bone
to the outer heterocity of the
tibia & to the head of the fibula
containing all the fibres of
insertion of the tensor fasciae
lateralis + 2/3 rd of the gluteus
maximus" -- "may be
made out, especially when the
limb is extended, running like
a tight bow string across the
rearing angle of the joint
in front of the biceps tendon."
- It is by taking advantage of this fact
in the pathology of the disease - by exerting our force upward as well as transversely to the longaxis of the femur - that we avoid excessive strain on the intrinsic structures of the joint & other results that are apt to happen in Delore's former methods. it is however only one of the safeguards - the proper selection of cases as I shall afterwards shew is a more important one.

The deformity being by the aforesaid method corrected - a long splint is applied to the outer side of the thigh, maintaining the corrected position. - In 24 hrs. as a rule - a plaster case, reaching from the foot as far up the femur as possible, is substituted for the splint - care being taken before the plaster sets to have the limb in good position.
The child as a rule suffers little pain - and from this time the plaster is put on, there is little trouble in the after management. The mother is directed to be careful that the plaster is not soiled, or it may involve putting on a fresh case. - the lint is as a rule left in the plaster for 6 weeks.

A most important point in the after-treatment, is the administration of suitable diet, + remedies for the treatment of the rickets. The patient may +, as a matter of precaution, only gradually allowed to put his weight on his heels when the plaster is removed. Massage + cold douching are also of value. - most rickety children have also a tendency to flat foot, which it is well to attend to.
The results of manual osteoclasis, in cases of simple curves of the shaft of the humerus or femur, entirely confirm the opinion expressed by Dr. H. Wright, who states that "in these cases it is a good simple method."

The method adopted for the rectification of these, is similar to that described in their work (page 342) viz. "the child's limb is taken in one hand just above, & in the other just below the deformity. The limb is steadily & forcibly bent by the hands, the deformity being corrected, the limb is put on a splint for 24 hours, & then in plaster from the foot to above the knee, it is left on for 4 or 5 weeks. The after treatment being the same as in quena-balga.

The results of these methods of treatment, in some cases so ill, unless it, I propose to give later on.
The objections which have been raised to Delor's & Faillaux's method do not apply to theirs. It is said that the joint is straightened at the expense of considerable anatomical lesions of considerable moment; the functions of the joint are often seriously impaired. Amongst the lesions said to be produced are:

1. Separation of the epiphyseal of the lower end of the femur, of the femoral tuberosity, & of the head of the fibula.
2. Rupture of the external lateral ligament.
3. Synovitis of a severe character.
4. Separation of articular surfaces as evidenced by lateral mobility of the joint.

(Quoted — Huxley on the osteoclast pages 136l.
Asby & Wright — State that "Except for simple cases of the shaft..."
of the hina tibia or young children, before ossification has occurred, we consider possible straightening, utterly unjustifiable and unsurgical.

Three various objections I propose specifically to examine:

With regard to the 1st viz that there is separation of the lower epiphysio of the femur.

The evidence I have obtained is pathological and clinical.

In the post-mortem table in a child 6 yrs old with knock knee twixt the bones ossified, there was some laceration of the ligaments & partial separation of the lower epiphysio & of the femur.

But it was only by exerting the greatest force, that any fracture was completed at all.

In a child of 3 yrs without any evidence of rickets, fracture was only completed with greater force than I have ever
used for purposes of treatment, no evidence of separation of the epiphysis was found, no laceration of ligaments.

In a rickety child of about 4 years, where the femur was broken with ease, at with the same amount of force as one uses on the operating table, there was no trace of separation of the femoral, tibia, or pubic epiphysis — no trace of rupture of ligaments, muscles, or tendons at the line of fracture corresponded almost exactly with the line I had marked out before fracuring.

But clinical observation in my opinion, affords much more reliable evidence. In a series of 20 cases Dr. Murray marked out the intended line of fracture before operating, in every case but one (which I shall presently relate) — the
W. Williams  set 4. - Case with separation of with condyle of femur 
before & after treatment.
intended, corresponded with the actual line of fracture—fully accurately—was either naso-rose, or slightly oblique from without inwards—in a small proportion of cases the fracture was greenstick & it was not necessary to complete it, in order to correct the deformity.

In the exception to which I refer—the internal condyle was separated & forced upwards. It could be felt as a separate wedge shaped piece of bone, & it practically an osteo's operation without the wound. This is the only case in some to which I have seen it occur. He had some slight increase of pain, & some swelling of the joint afterwards, but this was merely temporary & subsequently he did as well as the others. This photo before & after are shown.
But another possible means of testing the question of separation of the epiplasyos, at once suggested itself. If the epiplasyos of a bone are separated, the development of the bone in its length should be arrested. To test this question thoroughly, one would need to see the patient some years after the operation.

With this object, I examined the legs of some of patients, on whose osteosynthesis of the femur for knock knee on one side only, had been performed.

1. Eleanor III aged 7. Osteosynthesis of left leg, performed on Aug 28th 1888. On measuring it comparing the length of the femura, in April 1893 — nearly 4 1/2 years after, I could detect, by most careful measurement, no difference between them. The patient walked
1. Alfred R., aged 6 yrs. operated on in March 1870, and it had been stated in the notes of his case that one femur only had been fractured - but did not say which - nor could I by any means detect it on examining in April 1873 - practically 3 yrs. after.

2. Lily G., aged 6 yrs. - left femur fractured Nov. 1870. The right leg was about 1/4 in. longer than left (? normal).

3. In the 3rd case the femur was fractured during my residence I measured the limb up to 6 months after the operation, but could detect no difference.

One would not, however, be justified from the above limited evidence
Cases of fractures in stature, that no shortening of the bone occurs, but the evidence they afford is, I think, of value.

2. I have never seen any evidence of rupture of the extensorial ligament with regard to it. Synovitis of a dense character. The only case in which I observed any evidence of synovitis was in the one detailed above, where the inner condyle was separated; here as I have stated, it was only slight, of a temporary character, it did not delay the progress of the case to any appreciable degree.

Reading that it was urged as an objection, out for it, I examined many joints at intervals of 24, 36, 48, 72 hrs. after, without ever finding it. Nor have I ever seen any displacement of semilunar cartilages.

A certain amount of lateral
Mobility of the joint is commonly found in ricketsy children—nothing in excess of this is seen in children after operation, either at recent, or lengthy period, after. I have however, seen marked lateral mobility in a case of knock knee, where a splint had been worn for some time for the care of the latter.

In treating a case of ricketsy deformity then, one had to decide between

1. Splint
2. Coloredlass
3. Osteotomy

Between (1) & (2), one is mainly guided by taking into account the age, & kind of deformity. Most children of 2 yrs can (osteio lacion) be treated by splints; cases of the tibia, especially the anterior posteri one, are acne and unable to treatment, & show
Perhaps more tendency to spontaneous recovery.

Where the deformity is great, e.g., in a child of 3-4, where with the limbs extended there is a considerable interval between the malleoli and the internal condyle of the knee (fifth femoral and vertical) projects much lower than external, Dechamps is often preferable.

Generally, parents who are in fair circumstances, it were able to attend to their children, these splints may be applied with a far better chance of success, than in those cases where, as frequently happens, the parents have to go out to work, it leave their children in charge of a neighbour or nobody at all.

In many cases, it is well to try the effect of a splint, before
restoring to other measures. Decondos is, I believe, preferable to osteotomy in the treatment of cases of the above mentioned deformities - where the bones are not ossified, rarely of an age exceeding 5 yrs. but most commonly between 2½ to 5 yrs. In such cases, it is rare that any but a moderate degree of force is necessary to fracture the bone. If such force is necessary - it is better to perform osteotomy. After performing a few operations, one generally is able to fracture a femur with much less energy, it is a useful rough guide as to the force that will be necessary, is found on observing the thickening at the epiphysical end of the bone. If there is fairly marked, the femur bone will be, after a parabolic, nearly easy to fracture.
The following table shows the number of cases treated at the Children’s Infirmary, Liverpool, since the operation was first started:

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<th>Year</th>
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<th>1889</th>
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<td>72</td>
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</table>

The following cases, with their photographs taken before treatment, and at periods ranging from 6 weeks to 6 months after treatment, will perhaps, serve to illustrate the average class of cases treated by manual osteoclasis. They represent deformities, by no means the most severe amenable to it, while many less severe were treated by osteoclasis successfully. And a large number not amenable to it, had osteoclasis performed.
1. A.M. Miller aged 3 yrs Aircraft - admitted to the Children's Infirmary Aug 31st 1899 suffering from genu varia. He presented the usual signs of rickets - lower end of radius & ulna evidently but not markedly enlarged.
Has slight anterior and posterior curves of tibiae & fibulae
With legs extended & internal rotation together - 1 1/4 inches between the 2 cut malleoli
Left cut malleolus 2 1/2 cm from medial plane
Right " " 1 3/4 " " "
Left 3rd & 4th attempts about 1 1/2 above knee joint - without difficulty
Fracture hausserae.
Left 5th No squinting, no after tarsal, put in plaster & discharged.
Plaster was removed 6 wks after - the photograph was taken 12 wks after operation, when patient could walk about quite well.
Patrick O'Shea, aged 4, admitted Oct 28th 1892

L.O. 1 " with genua valga, most marked on right side - between malleoli with legs extended 1 inch condyles together = 5 1/4" inches.
The patient could not walk at all, without support, it then only very poorly.

Oct 29th Osteoclasis both femora: fracture haemorhoea. 1/2" above condyleo, in both cases.

Discharged in plaster Nov 1st.
No photo of their case was taken.

He was brought up from time to time for observation, carth after operation, he was walking well, 7 1/2" walks after, continued well without any trace of relapse.

The next case contrasted osteoclasis, with simple osteotomy of theibia. It is but fair to state however, that the result of the osteotomy is only a moderately good one, though
It is not brought outside photograph, the right leg was rather more deformed than the left.

3. Norman Rees, aged 4 yrs admitted to L.C.I. Oct 10th 1892 for 'Crooked leg', three of tubercle curvet forward (anterior posterior) & slightly outward especially in their lower ends.

Oct 13th Dischasis left leg, oko young right leg. Put on back brace splint kept so for 10 days. Then wound being healed, both legs put in plaster for 6 weeks.

Was walking well & without any recurrence back after operation, when photo was taken.

H. Robert Hughes, aged 4 yrs admitted to L.C.I. Feb 10th 1893.

Gum varicen on both sides, but most marked on right.
Side - chiefly in fibrae tibiae. Jel 12th. Also classic both up about the middle. - pattering oblique from within outward & from above downwards.

Jel 14th. Discharged in plaster.
Plaster was removed 5 weeks after with result as shown.

These cases have been selected, as purely typical of the class of cases operated on. The results are neither better, than the average. The other 3 single photographs also represent common deformities due to rickets, as they are still in plaster, I have not been able to show the results.
Mr. Maclean in his work on osteotomy, when considering the subject of manual osteoclasis states: "The after results of osteoclasis manuelle offer no advantage, the patient being longer up in fluids, the after treatment recovery being more protracted. Later on he says: "It may be safely concluded, that osteoclasis manuelle or mecanique has served its time, it cannot be practiced in the presence of the more exact method of the present day."

Further on he states that, in the selection of his cases for osteotomy he operated on all patients presenting themselves—provided that their bones were in a suitable condition—that is, to say they were not soft or in a state of remollissement. If the patient were too young, they were advised to have the operation postponed."
of the tendency to recurrence.

The objection that the patient is longer up in splints, if the after recovery is more protracted, certainly does not apply to the method in children.

In osteoclasis of the fibula 6-5 who has been the usual rule in which the limb is kept in plaster - I do think it would be advised to keep them still for a shorter period after osteotomy.

In osteotomy of the femur, Mr Maclean states that his patients were generally kept in splints 6-8 weeks - in osteoclasis it is both in plaster.

The after recovery in children is not more protracted - I can see no reason why it should be.

During my year's residence at the hospital, a large proportion of out-patient surgical cases, came directly under my observation - I never saw a case
of relapse or recurrence after osteoclasis. Their absence may perhaps be accounted for, by
the fact that in all cases the importance of careful shining
hygiene, of the usual antiseptic remedies for rickets, is impressed
on the mother, during the 6
weeks necessary attendance, while
the plaster is still on.
The advantages of a simple, instead
of a compound fracture, of the
simplicity of the operation, are
too obvious for remark. In
hospital practice it has an
additional advantage, in that
osteoclasis may be quite well
performed on out-patients —
in osteorynx, admission to the
hospital is, of course, absolutely
necessary.
In Lyons & Bordeaux — the osteocl
seems of late to have largely
replaced both manual osteo-
clasis & osteorynx. — So costly.
and ameliorate an instrument, even if it is preferable in other ways, could only be at the service of large hospitals. It does not seem to me, that in manual osteoclasis, in properly selected cases, we have a simple, safe, effective remedy for rickets, deformities. I cannot, with the results uniformly good results of such a series of cases, but think, that if the remedy were more widely practiced, it would be found of great value. I that the number of cases, which are allowed to linger on, until osteotomy is the only remedy, would be very much diminished. It seems to me, to be adapted for that very class of cases, in which Mr. MacEvery deems operation.