

METAL CERCLAGE IN THE TREATMENT OF FRACTURES OF LONG BONES

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Circular constriction in the treatment of fractures of long bones using metal bands was described by F. W. Parham at a meeting of the American Society of Clinical Surgeons in New Orleans in 1914. In 1916, Parham published the description of his instruments and their usage. In that same journal Lund from Boston reported and commented favourably on the use of the bands in 14 cases.

Since that time this method of fixation for fractures has been little used and has generally been viewed with suspicion by most surgeons. Many feel that circular constriction of a bone would lead to constriction necrosis with subsequent refracture of the bone.

Watson-Jones in his "Fractures and Joint Injuries" wrote, "It is tempting to immobilise a spiral or long oblique fracture with encircling wire or a Parham's band. Perfect fixation can be secured, but the technique is unsafe. The pressure of the metal causes absorption of the underlying bone and refracture at this level has been reported many times. Even a strong catgut suture tied tightly round a bone can cause sufficient bone absorption to produce an almost spontaneous fracture."

We have been using Parham's bands in the treatment of fractures off and on since 1954, and could not recall a single case where a bone had refractured at the site of constriction. A review of the literature showed no record of a published case of refracture. It is interesting to note that Lund, when he published his paper in 1916 stated, "When we first began to use the bands we were warned by various surgical wiseacres that in children, as the bones grew, the bands would cut in and girdle the bone and that fracture would result; or that the band would cut off the nourishment from the distal portion of the bone and prevent its growth, comparison being made to girdling a growing tree by a wire tight enough

to cut off the flow of sap and kill it. But the blood and lymph which nourish a bone do not flow straight up between the periosteum and bone as does the sap between the bark and wood of a tree, from bottom to top. The periosteum from which the surface of the bone is regenerated is nourished by blood vessels from all sides, which are not cut off by the band."

Growth in girth of a long bone is mainly appositional growth. Provided the metal used is inert one would expect bone to grow around and over a circular band placed around it eventually incorporating the band into the cortex of the bone.

It was therefore decided to undertake the present study with the primary objective of observing the delayed effects of metal cerclage on bones, and secondarily, to determine how useful the method was in the treatment of fractures.

Between January 1954 and December 1963, 25 cases of fractures of long bones (principally femur) were treated by Parham's bands either together with a Kuntscher nail or with P.O.P. hip spica.

The longest period of follow-up was 10 years, and the shortest period was 8 months. The average period after operation was 5.2 years. Of the 25 cases, 6 cases were children, ages 13, 12, 11, 7, 4 and 4 respectively.

The results are tabulated below:—

United	=	All
Incidence of sepsis	=	1 (4%)
Incidence of refracture	=	0
Incidence of breakage of bands	=	1 (4%)

None of the cases reviewed showed evidence of constriction necrosis. All the children showed radiological evidence of incorporation of the bands into the cortex.

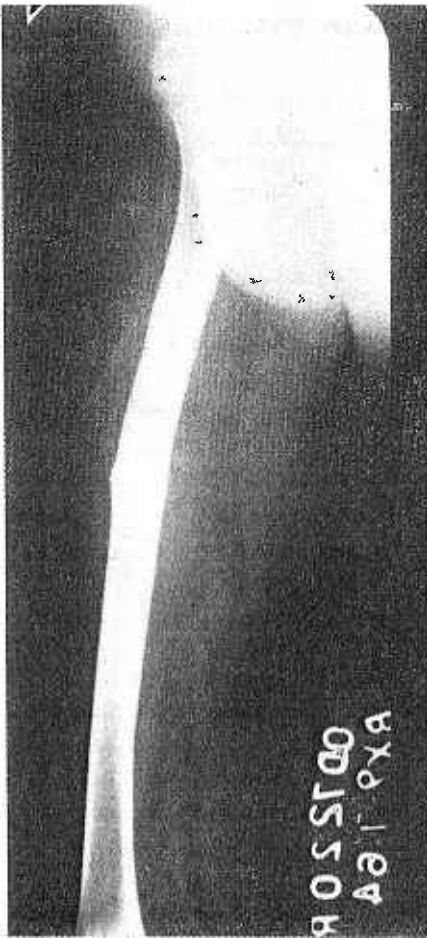


Fig. 1. Boy, now age 11. Operated on 4 years ago. Shows incorporation of band.



Fig. 3. Girl, age 8. Operated on 4 years ago. Shows incorporation of band.

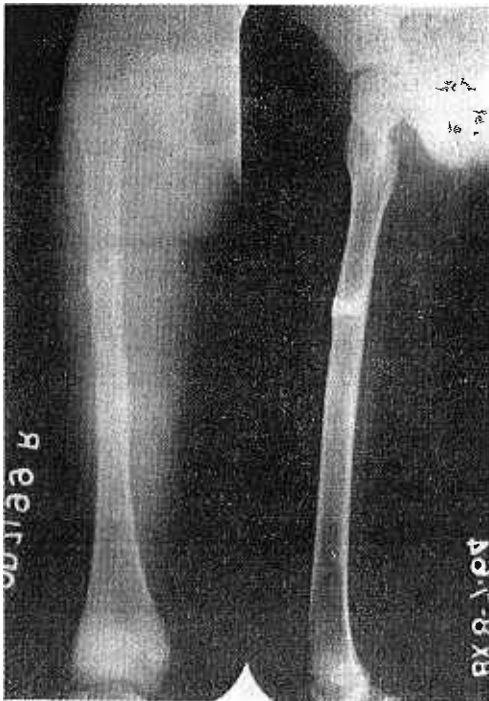


Fig. 2. Boy, now age 9, Operated on 5 years ago. Band incorporated



Fig. 4. Boy, age 11. Operated on 6 years ago. Band incorporated.



Fig. 6.



Fig. 8.



Fig. 7.

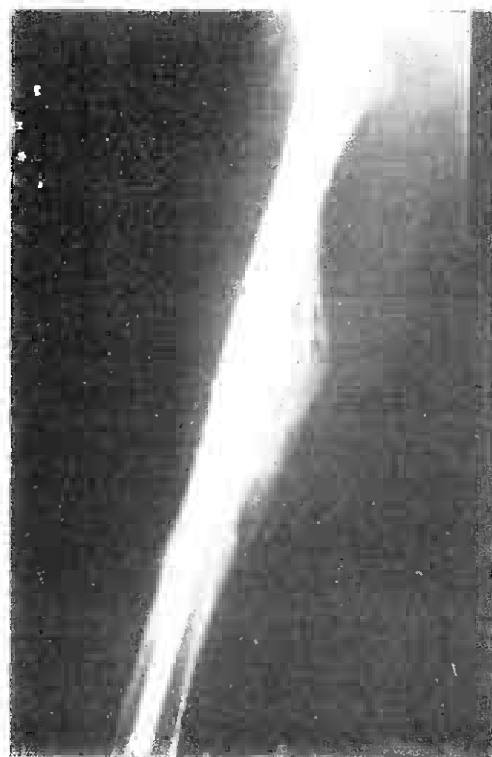


Fig. 9.

Figs. 6 & 7. Man of 19. First came to us 3 months after injury with 2½ ins. shortening of the leg. Fixation insecure with nail alone. Butterfly fragment banded.

Figs. 8 & 9. Woman, age 23. Appeared with 3 months old fracture and 2 ins. shortening. Fixation by nail alone inadequate. Satisfactory fixation after 2 bands were applied.

In the adults again no constriction necrosis was observed. When there was massive callus formation the callus merely grew around the band. The results of our series therefore showed no evidence in support of the view that late constriction necrosis occurred following metal cerclage of bone.

With regard to the usefulness of the method the question is more difficult to answer. There is no single best method in the treatment of fractures of long bones. For every fracture there are generally two or more equally acceptable methods of treatment. Good treatment, however, must be equated with the patient within the context of his environment.

Generally speaking, in regions where there is shortage of bed space and nursing staff, internal fixation of fractured femurs with early mobilisation, ease of nursing and earlier discharge is preferable to conservative treatment. If this point is granted, then one must also grant that there are the not infrequently met with cases of comminuted fractures with large butterfly fragments or the long oblique fractures for which a Kuntscher nail may provide inadequate fixation per se. In these cases we have found Parham bands useful as a supplementary procedure. Again, in the occasional cases in children where soft tissue interposition may require open reduction, a band around the fracture site will keep the fracture ends in position till a hip spica is applied. It must be appreciated, however, that Parham's bands by themselves cannot provide adequate fixation. They must always be supplemented by either a Kuntscher nail or an P.O.P. cast.

Figures 5 to 9 show some examples of their use.



Fig. 5. Man, aged 43. Two bands with hip spica. Post-operative X-ray shows position 2 years later.

SUMMARY

1. Twenty-five cases of fractures of femur over a 10 year period from June 1954 to December 1963 were reviewed.
2. There was not a single case of constriction necrosis caused by the bands.
3. In children it was found that the bands became incorporated into the cortex in every case.
4. There is a limited though useful case for the use of these bands. The indications were briefly outlined.

REFERENCES

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