

# PARKHILL (C.)

A NEW APPARATUS FOR THE FIXATION OF BONES  
AFTER RESECTION AND IN FRACTURES WITH  
A TENDENCY TO DISPLACEMENT:

*WITH REPORT OF CASES.*

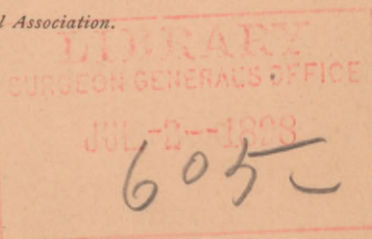
BY

CLAYTON PARKHILL, M.D.,  
DENVER, COL.

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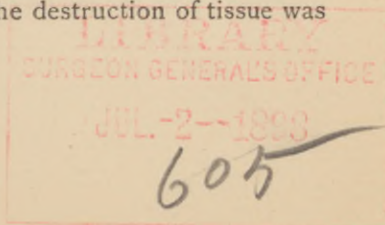
A NEW APPARATUS FOR THE FIXATION OF BONES  
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AN extended discussion of the various methods of fixation of fragments after resection, or of fractures with a tendency to displacement, would be superfluous in this Association after the exhaustive paper presented to it four years ago. However, the fact that professional opinion has not yet given its sanction to any particular method is sufficient evidence that none has been perfected. Whether, as has been suggested, modern antiseptic and aseptic procedures, through the lack of reaction following them, are responsible for an increase in the number of cases of pseudarthrosis need not be discussed. It is certain that all see many of these unfortunate conditions. We believe that the time has come when a more accurate fixation of the bones, both after resection for cases of pseudarthrosis and for mal-union, and also for fractures with a tendency to displacement, particularly if they be compound, should be used.

I beg leave to call your attention to a new method of immobilization of the bones in these cases. I was led to devise it three years ago for a case the history of which will be given below. A young man had pseudarthrosis of eleven months' standing. While drawing a loaded shot-gun from the end of a wagon it was discharged, and he received the entire load in his arm above the deltoid insertion. The destruction of tissue was





so great that but a quarter of an inch of the shaft remained attached to the head of the bone. I knew of no method in use which would fix this upper fragment, controlled as it was by the rotator muscles. This instrument proved entirely satisfactory. It is a steel clamp made of separable pieces in order to secure easy and accurate adjustment. It is heavily plated with silver in order to secure the antiseptic action of that metal. Clamps of different sizes are made to correspond with the bone upon which they are to be used. The largest size is for the femur; the intermediate size for the humerus and tibia; the smallest size for the radius, ulna, fibula, and clavicle. The instrument consists essentially of four screws or shafts. On these are cut threads at the lower end and also near the upper end. The extreme upper end, however, is made square so that the screw may be governed by a clock key. Two sets of wing plates are attached to these screws, a shorter pair corresponding to the inner screws and a longer pair to the outer. Each is attached to its screws by two nuts, one above the plate and the other below, for accuracy of adjustment. When in position one wing plate overlies the other in each half of the instrument. When ready to be clamped these plates lie side by side. They are fastened together by a steel clamp with a screw at either end.

In my first instrument the wing plates were permanently fastened to the shafts, but at the suggestion of Dr. Hugo Mager, of Denver, I was led to attach them by these nuts in order to secure a more accurate adjustment. The nuts are controlled by a small wrench.

Any method of resection of the bony fragments which may be found desirable in the particular case may be used. The transverse is probably the most easy of execution, and generally the most desirable. The periosteum may or may not be separated from the fragments. Each fragment is drilled transversely to the longitudinal axis of the bone in two places. A small steel pin is thrust into the first hole while the second is being drilled, in order that they may be made parallel. The distance that these pins should be from each other and from the ends of

the bones should be determined by the bone under operation and by the size of the clamp to be used. The long shafts or screws are driven into these holes by means of the clock key and the wing plates adjusted. While the bones are held in accurate apposition the two halves of the instrument are clamped together. It will be found to absolutely prevent either lateral or longitudinal movement between the fragments. The instrument is long enough to permit the screws to project through the incision in the soft tissues so as to allow for the accurate suturing of the wound between its shafts, and also for the interposition of a dressing. The clamp should be removed at the end of from four to six weeks, depending upon the size of the bone operated upon.

I have also made a special form of clamp which I believe will be found useful in fractures of the neck of the femur. It has not been tried, however. It would seem to fix the head of the bone more securely than either the single screw or nail.

The following is an abstract of the histories of the cases upon which this instrument has been used.

CASE I.—Operator, Parkhill. W. S., aged nineteen years, was sent from Walsenburg to St. Luke's Hospital, Denver, November 20, 1894. Pseudarthrosis of the right humerus as the result of a gunshot-fracture eleven months previous. An open infected wound communicated with the upper fragment. On November 22d this wound was scraped out, removing all the infected tissue. It healed kindly, and on January 3, 1895, the clamp was used for uniting the fragments. The bones were found separated a distance of two inches. The upper fragment had a length of one and a half inches including the head, and was very soft. Transverse resection. The wound was closed about the clamp without drainage. The extremity, including the chest, was inclosed in a plaster-of-Paris dressing. No reaction. The dressing was removed February 7, 1895, when the wound was entirely healed. No infection. The clamp screws were lifted out without force. The sutures were removed. A dressing and cast applied. This was removed at the end of four weeks. Perfect union was observed.

CASE II.—Operator, Parkhill. M. M., aged forty years, was sent from Victor, Colo. Pseudarthrosis of nine months' standing, at the



junction of the lower and middle thirds of the right femur. There was great deformity with retro-displacement of the lower fragment, customary in such fractures. Operated July 7, 1896. An anterior section of the soft tissues showed the lower end of the upper fragment resting upon the anterior surface of the lower. No attempt at osseous union. A large amount of fibrous tissue was removed with the scissors. The oblique ends of the fragments were freshened by means of the rongeur and Volkman spoon. A large size femur clasp was applied. Wound sutured about clamp without drainage. Sterilized dressing applied, and extremity inclosed in plaster-of-Paris. No reaction from operation. Dressing removed at the end of eight weeks. Perfect union of fragments. No infection of the wound. Small dressing applied and plaster-of-Paris splint for three weeks longer. Present condition, perfectly useful extremity.

CASE III.—Operator, Parkhill. Delayed union. Dr. S. J., aged twenty-six years, on July 1, 1896, suffered oblique fracture of both bones of the leg at the junction of the lower with the middle third in a runaway accident. Temporary dressing in a fracture box. Later, when the swelling had subsided, in plaster-of-Paris. At the end of six weeks some evidence of union, but far from perfect. Very impatient to secure union and get about his work. Operated August 15th. Considerable amount of new osseous tissue filling the gap between the fragments. Also some fibrous tissue. Latter removed with a Volkman spoon. Fragments drawn into accurate apposition and secured by a clamp. Wound sutured about clamp without drainage. Antiseptic dressing. Leg enclosed in plaster-of-Paris. No reaction. Clamp removed at the end of five weeks. No infection. Perfect union. Antiseptic dressing applied. Was given crutches. Perfect result at this time.

CASE IV.—Operator, Parkhill. A. S., aged twenty-three years, pseudarthrosis of both bones of the right forearm as the result of a gunshot-injury received in Utah eight months previous. Sent to operator from Aspen, Col. Admitted to St. Luke's Hospital, August 12, 1896. Operated August 14th. Fracture in middle of the forearm. Fragments separated about one inch. Large amount of fibrous tissue between the bones. Transverse resection of all the fragments so as to secure a symmetrical forearm. A small clamp used for each bone. Wound sutured about clamps without drainage. Antiseptic dressing applied. The forearm enclosed in plaster-of-Paris splint. No reaction. Dressing removed at the end of six weeks. Clamps taken out.

No infection. Good union of both bones. Small antiseptic dressing applied. Forearm placed in anterior metallic splint. When seen two months later had regained considerable amount of motion in the fingers, and the hand promised to be a very useful one.

CASE V.—Operator, Mager. Recent fracture with tendency to displacement. A. D., aged thirty-two years, travelling salesman. Steady drinker for some years. On December 24, 1895, while driving in the mountains, the horses became frightened and ran away. He was thrown from the buggy. Right leg caught in wheel causing compound comminuted fracture of both bones in the middle third. Admitted to the hospital the same evening. Wound cleansed mechanically and antiseptically. Small fragments of bone removed. Resection of fragments of tibia. Union by silver wire. Aside from normal aseptic fever, no reaction. At the end of a week, during sleep, a violent muscular contraction broke the wire and again fractured the lower end of the upper fragment. On January 5th second operation was performed. Second resection of upper fragment. Parkhill clamp used. Antiseptic dressing. Plaster-of-Paris cast. At the end of seven weeks dressings were removed. Union, but not strong. Antiseptic dressing reapplied. Perfect union at the end of ten weeks. Useful extremity.

CASE VI.—Operator, McNaught. Pseudarthrosis of the right humerus. G. B., aged thirty-five years. Railroad accident November 2, 1895. Car wheel passed over the upper fourth of the right humerus, producing compound comminuted fracture. Great destruction of the soft tissue and bone. Lack of union after the wound had healed. Operated February 2, 1897, at St. Luke's Hospital. Transverse section. Parkhill clamp used, wound closed about the clamp without drainage. Antiseptic dressing. Plaster-of-Paris cast. Clamp removed at the end of six weeks. Good union, with useful extremity.

CASE VII.—Operator, McNaught. Pseudarthrosis of the left humerus, one and a half inches from elbow-joint. H. H., aged sixty years. Operated May 21, 1896. Parkhill clamp used. At the end of six weeks the clamp was removed. Good union. Discharged from hospital. The night following discharge the patient, in a drunken spree, refractured the arm. The following November again presented himself for treatment, requesting that the same instrument be used. Clamp applied, and at the end of six weeks perfect union was obtained.

CASE VIII.—Operator, Freeman. Pseudarthrosis of left humerus. A. C., aged thirty-five years. Eighteen months previous to operation



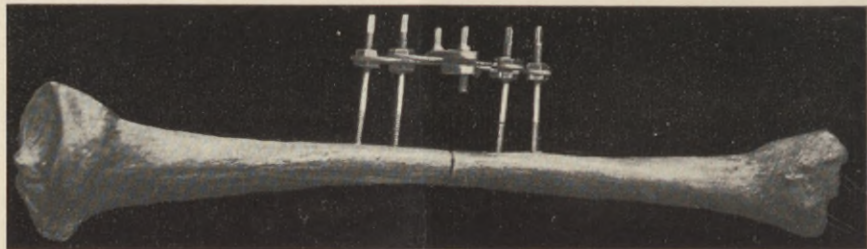
received comminuted fracture of the left humerus at the junction of upper and middle thirds. In May, 1896, admitted to Arapahoe County Hospital, Denver. Fibrous union and a small sinus. Operated by surgeon on duty. Resection of ends and suture by silver wire. Failure. Operated September 30, 1896. Ends again resected and united by Parkhill clamp. Upper fragment of shaft not more than one-quarter of an inch in length. Practically nothing but head of bone remaining. Clamp applied, size for femur instead of humerus, so that application was difficult. Much oozing from the wound. Impossible to entirely check it. This necessitated frequent changes of dressing for considerable length of time. Infection lasting about three weeks. Clamp removed November 3d. Perfect union at shoulder-joint. Patient could place hand on top of the head. Useful extremity.

CASE IX.—Operator, Parkhill. W. M., aged thirteen years, malunion of the left femur of about ten months' standing, fracture having occurred at junction of upper with middle third. Upper fragment tilted upward and outward. Lower fragment united with it at an angle, producing great deformity and much shortening. Operated February 5, 1897. Anterior incision. Fragments separated with difficulty by means of saw and chisel. Transverse section of ends. Extremity extended, and a gain in length secured amounting to from an inch to an inch and a half. Clamp applied. Wound sutured about instrument without drainage. Antiseptic dressing and entire extremity and pelvis enclosed in plaster cast. Dressing removed at end of seven weeks. Perfect union and perfect symmetry of bone. No infection. A light dressing, with external and posterior light splint. Dressing taken off at end of nine weeks and splints removed. Was given crutches and is now walking on the extremity.

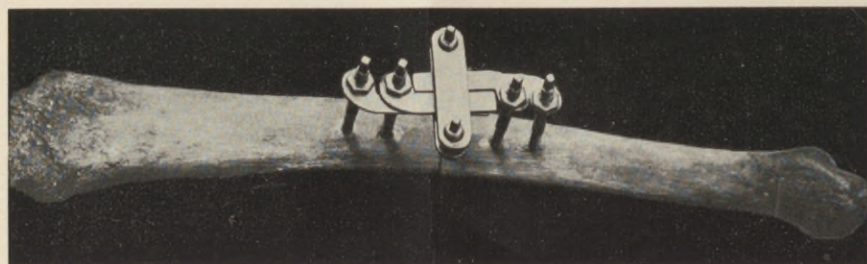
We claim for this instrument: first, that it may be easily and accurately adjusted, and prevents both longitudinal and lateral movements between the fragments; second, that nothing is left in the tissues which might reduce their vitality and lead to pain and infection; third, that no secondary operation is necessitated; fourth, that no method has ever before given 100 per cent. of cures.



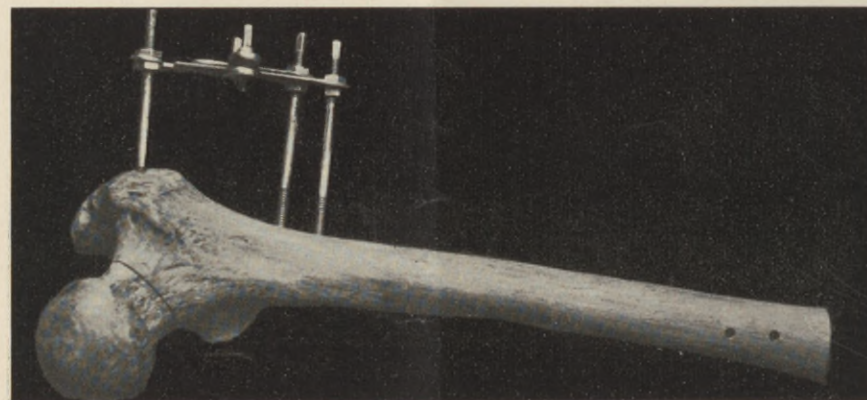




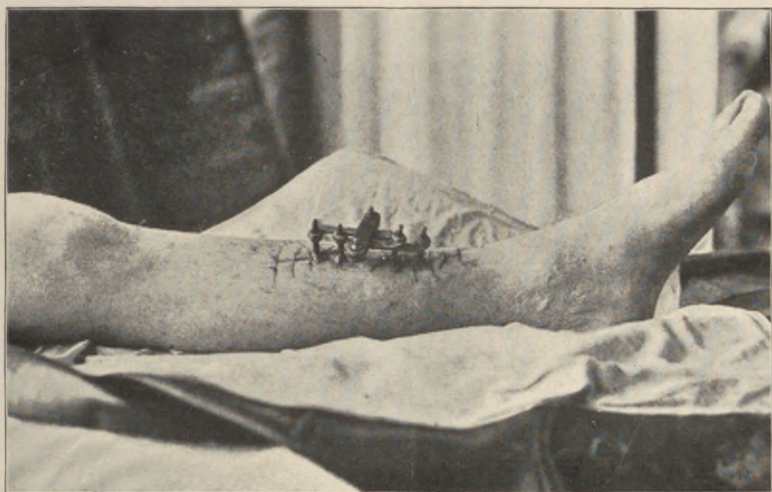
Side view of clamp in tibia.



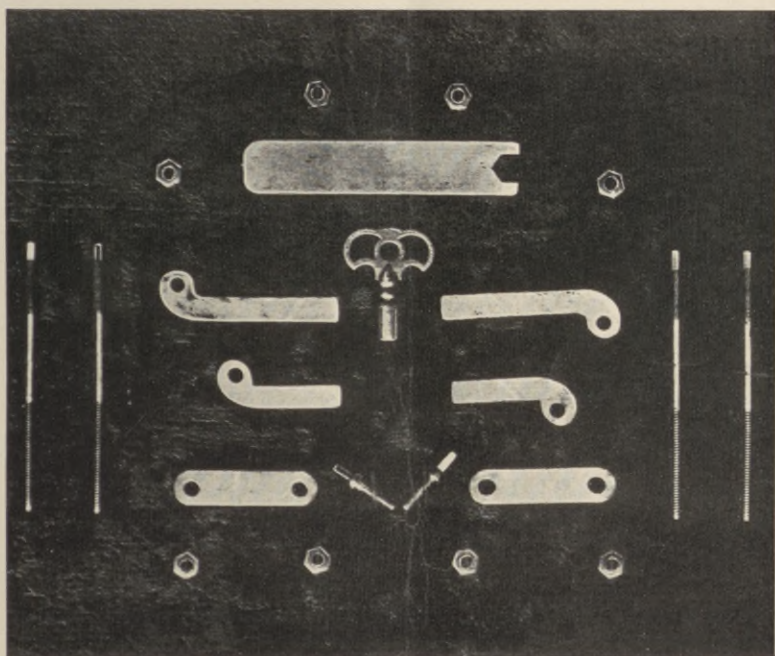
Top view of clamp in tibia.



Clamp for fractured neck of femur.



Clamp ready for removal at first dressing, end of six weeks.



Separate pieces of clamp.













