

TREATMENT OF POSTTRAUMATIC CLAVICULAR PSEUDARTHROSIS

PER EDVARSDEN & OTTAR ØDEGÅRD

Orthopaedic Department, University of Trondheim Hospital, Trondheim, Norway.

Six patients with posttraumatic pseudarthrosis of the clavicle were treated during 1973 and 1974 with an operative technique consisting of trimming of the bone ends, placement of a cortical bone transplant posteriorly and a metal plate anteriorly, and fixation of the plates with screws. At examination 10-23 months postoperatively complete healing had been achieved in all cases.

Key words: clavicle fractures; pseudarthrosis surgery

Accepted 16.vi.77

Development of a pseudarthrosis after clavicular fracture is uncommon regardless of treatment, but it seems to occur more frequently after primary operative than after conservative treatment (Watson-Jones 1960, Apley 1968). Neer (1960) reports the incidence of pseudarthrosis after clavicular fracture to be 0.1 per cent after conservative treatment, and 4.4 per cent after operative treatment in a material of 2235 conservatively treated and 45 operated patients; Rowe (1968) reports the incidence as 0.8 and 3.7 per cent, respectively.

PATIENTS AND METHODS

During the years 1973 and 1974, six patients with posttraumatic clavicular pseudarthrosis presented for treatment. Half of the patients were younger than 20 years on admission, the oldest one being 57 years; five were males, and one was a female. Three had a right-sided, and three a left-sided fracture. The time interval between fracture and pseudarthrosis operation varied between 6 months and 3 years. The reason for the long interval in some cases was lack of trouble-

some symptoms as also pointed out by Campbell (1971) and Sakellarides (1961).

The operative technique applied was introduced by the late Professor Alvik (personal communication, 1965): The bone ends are trimmed, a cortical bone transplant is modelled in the form of a plate and placed on the supero-posterior aspect of the clavicle, and a 4-6 hole metal plate is placed on the infero-anterior aspect. The medullary side of the transplant faces the clavicular cortex after roughing of the latter with a chisel. Screws, from the metal plate, fasten both plates to the clavicle and secure a rigid fixation. A schematic presentation of the technique is given in Figure 1.

The choice of bone for transplantation was determined by the demand for strength, and the availability of bone. In three cases a homotransplant of tibia sponge from the bone bank was used while in the remaining cases autotransplants from the tibial crest were used. Mitella

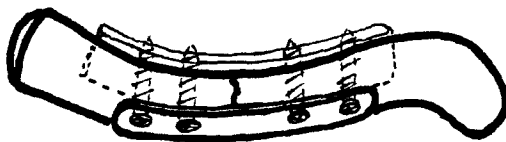


Figure 1. Principle of fixation. Screws from the metal plate pass through the clavicle and the bone transplant.



Figure 2-A. Hypertrophic pseudarthrosis.

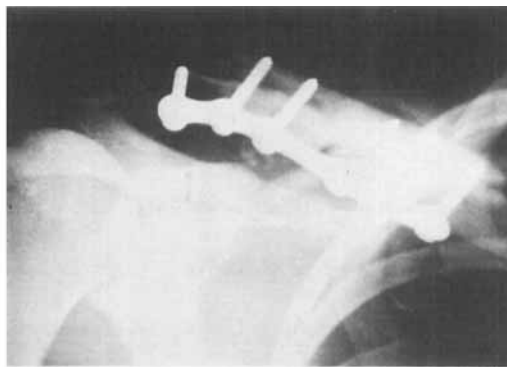


Figure 2-B. Operation performed.

is applied postoperatively for a couple of weeks, and passive mobilisation exercises of the shoulder joint are started immediately. All the patients were re-examined from 10 to 23 months after the operation.

RESULTS AND DISCUSSION

During the follow-up period, the cases operated were examined both clinically and radiologically, and complete healing was demonstrated in all patients. A typical pseudarthrosis before and after treatment is shown in Figure 2. The treatment described above for clavicular pseudarthrosis has yielded excellent results, has proved to be simple to perform, and has been without any complications.

REFERENCES

- Apley, A. G. (1968) *A system of orthopaedics and fractures*. 3rd ed. p. 409, Butterworths, London.
- Campbell's operative orthopaedics (1971) Vol. 1, 5th ed. Ed. Speed, J. S. & Knight, R. A., p. 804. The C. V. Mosby Co., Saint Louis.
- Neer, C. S. (1960) Non-union of the clavicle. *J. Amer. med. Ass.* **172**, 1006-1011.
- Rowe, C. R. (1968) An atlas of anatomy and treatment of midclavicular fractures. *Clin. Orthop.* **58**, 29-42.
- Sakellarides, H. (1961) Pseudarthrosis of the clavicle. *J. Bone Jt Surg.* **43-A**, 130-138.
- Watson-Jones, R. (1960) *Fractures and joint injuries*. Vol. 2, 4th ed., p. 462. E. & S. Livingstone Ltd., Edinburgh.

Correspondence to: Per Edvardsen, M.D., Orthopaedic Department, University of Trondheim Hospital, 7000 Trondheim, Norway.