

# Compression miniplate application in mandibular fractures

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*Twent patients with thirty -two mandibular fractures were treated by using compression miniplate at 2.nd Plastic and Reconstructive Surgery Clinic of Ankara Numune Hospital in 1991. Complications such as malunion, nonunion and osteomyelitis were not observed. This report updates the use of this technique. [Turk J Med Res 1993; 11(4): 202-205]*

Key Words: Mandibular fractures, Miniplate, Compression

Mandibular fractures are among the mostly seen facial fractures due to traffic accidents. With in the facial fractures mandibular fractures constitute 78.5% according to Larsen (1) and 47% according to Mc Coy (2).

Different techniques have been used for the treatment of mandibular fractures for years. It was difficult to treat the mandible with the total or partial loss of teeth, the infected fractures and the patients having medical and social problems with conventional approach.

Internal fixation techniques and plates have been in use since 1970s.

Luhr made the compression mandibular plates using vitallium in 1968 (3).

Because these plates were expensive and inaccessible, we started to use axial compression miniplates firstly designed by us and manufactured by Akay firm by stainless steel in 1986. But they were generally removed 6 months later since they caused corosions in bones in 2.5 years. Today compression miniplates made of vitallium are being used.

There are some dental and orthopedic principles in the treatment of mandibular fractures: 1) The anatomical positioning of the fracture line, 2) the restoration of premorbid occlusion, 3) the rigid mobilization of the fracture line, 4) the early and optimal restoration of the function, and 5) the prevention of infection, nonunion and malunion.

## MATERIALS AND METHODS

Internal fixation with axial compression miniplates made of vitallium was applied to 32 mandibular fractures of 20 patients admitted to 2nd Plastic and Reconstructive Surgery Clinic of Ankara Numune Hospital in 1991 (Figures 1-2). Compression miniplates were usually placed by intraoral approach under local or general anesthesia in emergency conditions if there was no skin laceration. Prophylactic antibiotic was not used (Figures 3A, 3B, 4A, and 4B).

80% of our patients was male and 20% was female. 75% was between 15 and 45 years of age (Table 1). The localization of the fractures was 40% in the angle, 35% in the corpus and 25% in the symphysis mandible. 80% was open fracture and in 60% the fracture was single (Table 2).

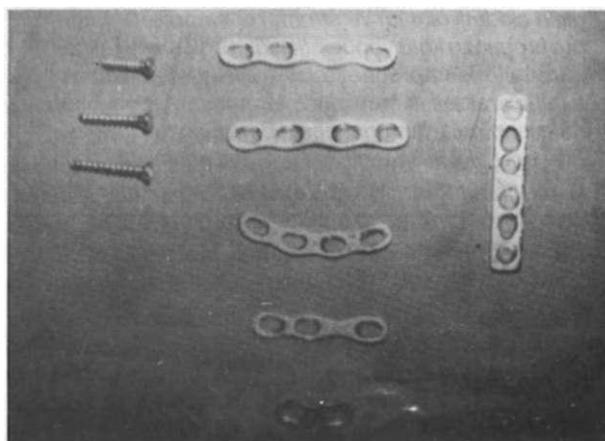
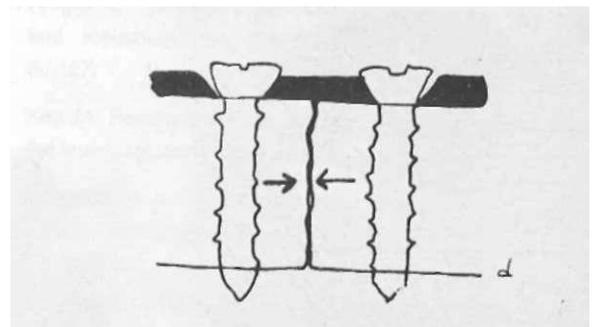
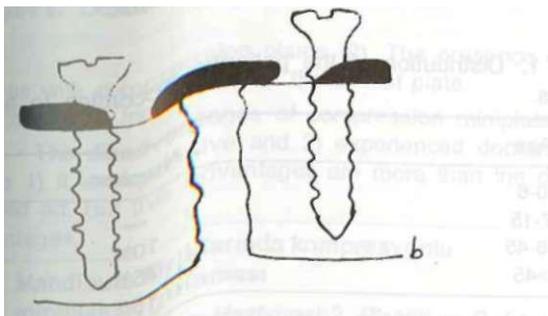
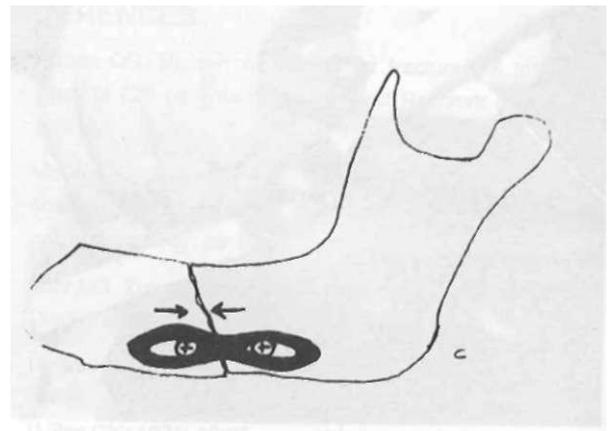
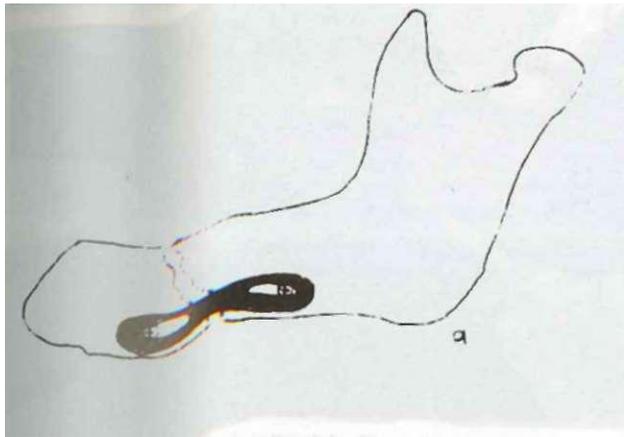


Figure 1. Our compression miniplates.

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**RESULTS**

After the operation, hyposthesia was seen in 3 patients due to extension of the mental nerve, tissue infection occurred in 5 patients a short time.  $\Delta$  spontaneously normalized in the (Table 3) Sensation within 4 weeks. Soft tissue patients with infections did not with antiseptics (Figure 5). resolved by clean

**DISCUSSION**

Mandibular fractures are treated conservatively or surgically. Surgically, Wassmund put open reduction world wars I and fixation with this operation were due to delayed that the failure cause of postoperative infections, fracture healing problems and pseudoarthroses as a result of osteofibrosis. The external pin fixation in Anderson preferred because of difficulty 1936; but it was a circumferential wire technique in use. Black wire fixation defined by Brawn and Interosseous is rarely used, but because of Mc Dowel in the stabilization it did not get common failure in compound (5).

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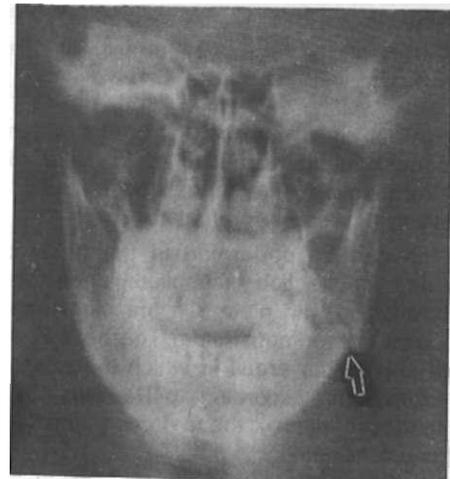


Figure 3 A fracture line in the left angle and right corpus of the mandible in an X-ray taken from one of our patients.

After the world war II antibiotics appeared and the surgical techniques and the success rate were increased with the development in metalurgy. But non of these methods could take the place of intermaxillary fixation with arch-bar which is still used conservative treatment method.

Intermaxillary fixation was thought as obligatory besides osteosynthesis even in the operative methods (1,2,10).

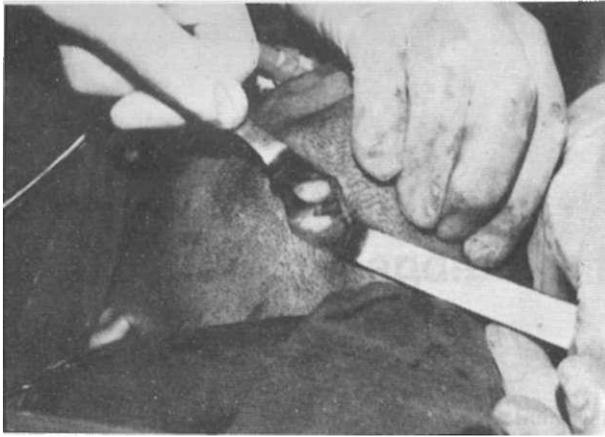


Figure 3 B Fracture line during operation



Figure 4 A. The roentgenographic view at a fracture line after insertion of the plate.

The effect of compression osteosynthesis on primary bone healing was studied in 1932 (6) and after the introduction of compression plates in 1958 they started to be used in oral surgery.

Fixation can be performed in the basal part of the bone and the traction is applied in the vestibular side in stabilization with plate. On the other hand contraction occurs in the lingual side. The healing of bone is possible only in the areas in which there is no traction and contraction according to Pauwels (8). Compression plates minimize these forces and help the primary bone healing.

Osteosynthesis with dynamic compression is an alternative method used in the treatment of mandibular fractures with some advantages. These advantages are as follows: 1) intermaxillary fixation is not used, 2) postoperative infection incidence is less, 3) quicker healing and 4) healing without callus formation. At the same time the dynamic load produced by the jaw motions is balanced by the static load produced by plates. Mandible gets its functions early and oral hygiene, feeding and speaking become better. In addition potential temporomandibular joint and neuromuscular dysfunction are prevented. Occasional disharmony decreases due to compression in fracture lines.

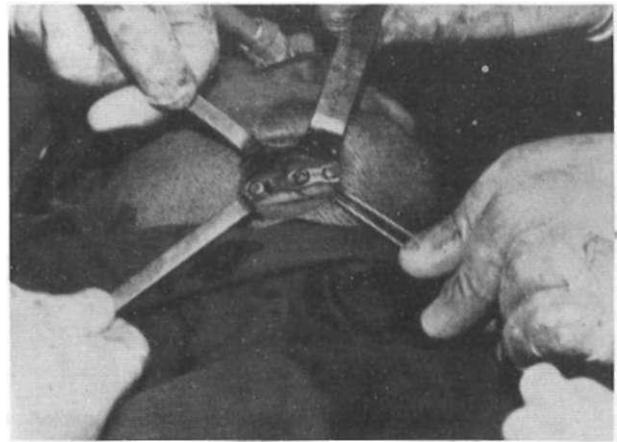


Figure 4 B A fracture line with plate after operation.

Table 1. Distribution of the patients according to age groups.

Age	Number
0-6	—
7-15	10%
16-45	75%
>45	15%

Table 2. Distribution according to types of fractures.

Type of the fracture	Number of the patients	%
Open fracture	16	80
Closed fracture	4	20
Single fracture	12	60
Multiple fracture	8	40

Table 3. Complications.

Complications	Number	%
Malunion	—	—
Nonunion	—	—
Osteomyelitis	—	—
Hypoesthesia of short duration	3	15
Soft Tissue infection	5	25
Anesthesia	—	—

It is possible to give a shape to plates and this is another helping factor. This is a unique method in the treatment of mandibular fractures in some patients such as those mentally retarded and epileptic. Some authors showed the infection was directly related to the mobility of the fracture ends. So the rigid immobilization decreases the risk of infection. The plates used today are biologically inert. They are tightly screwed to the bone and the infection risk does not increase in spite of foreign body. Becker succeeded solid osseous union in all of 19 infected mandible frac-

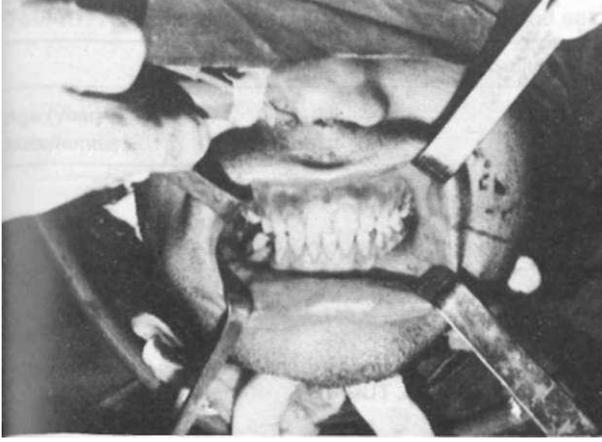


Figure 5. Occlusion after operation.

lures with compression plates (9). The presence of infection is an indication for the use of plate.

The disadvantages of compression miniplate use are 1) it is expensive and 2) experienced doctors are needed. But the advantages are more than the disadvantages.

#### **Mandibula kırıklarında kompresyonlu miniplak uygulaması**

*Ankara Numune Hastanesi 2. Plastik ve Rekonstrüktif Cerrahi Kliniği'nde 1991 yılında 20 hastada, 32 mandibula kırığına kompresyonlu mini plak uygulandı. Hastalarımızın hiçbirinde malunion, nonunion ve osteomyelit gözlenmedi. Yöntemin, diğer yöntemlere olan üstünlüğünü vurgulamak istiyoruz. [Turk J Med Res 1993; 11(4): 202-205]*

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