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[原著]Surgical Treatment of Compound, Comminuted Midfacial Fractures

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Surgical Treatment of Compound, Comminuted Midfacial Fractures

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Facial fractures are usually caused by motor vehicle accidents, have recently increased in number together with the increase of the motor vehicle accidents. Extensive multiple midfacial fractures are, above all, caused by such an accident. McCoy et al.[1] reported a series of 855 patients with facial fractures. According to the report, 40 percent of the patients had midfacial fractures. Rowe and Killey[2] analyzed 1500 facial fractures. The analysis revealed a total of 629 midfacial fractures, and about 47 percent of them resulted from motor vehicle accidents. Turvey[3] analyzed 593 midfacial fractures, and 46 percent of them resulted from motor vehicle accidents.

The bones of the midfacial skeleton are comparatively fragile and easily comminuted. In a severe Le Fort III type fracture, the middle third area may by comminuted into 60-70 separate fragments.[4]

The purpose of treatment for the facial fractures is the restoration of normal anatomic relations, beauty of the features, and normal function, including functional dental occlusion. As the complication arising from midfacial fractures, there may be head injuries, blindness, displopia, enophalmos, strabismus, alteration of the papillary level, epiphora due to damage to the nasolacrimal duct, anaesthesia in the distribution of infraorbital nerve or seventh cranial nerve, anosmia due to damage to the olfactory nerve and superior orbital fissure syndrome.[4]

If the fracture is inadequately reduced, there may by bony deformity of the face which consists of flattening of zygomatic regions, flattening or deviation of the nose, flattening of the entire face, producing the so-called "dish-face" deformity and excessive lengthening of the face. The gagging of the molar teeth with anterior open bite, which is caused by the downwards displacement of the upper jaw, pushes the mandible to the open position, so the patient complains of being "unable to open the mouth".

Report of a Case

A 17-year-old woman received a maxillofacial injury, that was multiple midfacial fractures, which was caused by an automobile accident at 10：30 p.m. On February 28, 1975., she was brought to the emergency hospital by ambulance in the first place. Three hours later, she recovered consciousness. On the next day, she was referred to the oral surgery clinic of the Ryukyu University Hospital in Naha City, Okinawa, from the emergency hospital.

The initial examination at the university hospital revealed that she had no difficulty in breathing, but had gross swelling of the full face, which produced the ballooning of the face, laceration wounds of the face with sutures. Bilateral perioribtal ecchymosis were present,

and the eyes were damaged; haemorrhage in the left eye and loss of vision in the right eye. There was no ear bleeding, and the nares were blocked with blood-clot. The neurological examination revealed that she was in anaesthesia of the cheek and the upper lip, giving rise to no cerebrospinal fluid rhinorrhoea. She had difficulty in opening the mouth. There were gagging of the occlusion, anterior open bite, and unnatural mobility of the maxilla where the entire dento-alveolar portion of the upper jaw was found to be mobile by digital manipulation, but there was no soft-tissue lacerations wound in the oral mucosa.

The radiographic examination supported the clinical impression of the multiple midfacial fractures, including the fractures of the nasal bones and the zygomatic bones , and the pyramidal fracture involving the bilateral maxillaries. The mandible was firm, so she was diagnosed as Le Fort III type fracture coexistent with Le Fort I and II types, complicated by the rupture of the right eyeball (Fig 1).

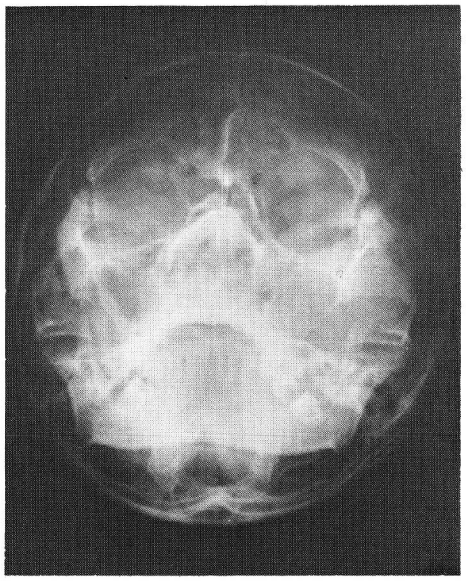

Fig. 1 Initial waters' projection showing comminuted midfacial fractures.

After the advices of the neurosurgeon and the ophthalmologist were given, she was immediately admitted to the oral surgery clinic on the same day. The immediate treatment was directed to the patient's general medical condition. She was given by transfusion and antibiotic chemotherapy. Blood transfusion was given by the hematological examination. After the swelling subsided in a week, a tracheostomy was performed, and then she was operated on for open reduction under general anaesthesia on March 7.

After the enucleation of the right eye, it was necessary to open the soft tissue closures of the periorbital lacerations in order to expose the lateral and underwall of the orbital rims and the maxillary antrum. Bilateral margins of the orbital cavities and the left maxillary sinus were comminuted (Fig 2). The left zygomatic bone was depressed in the maxillary sinus, which resulted in inward displacement of the zygomatic bone. The fractured nasal bones were elevated into position by forceps for manipulating the fragments. The ethmoidal sinus was opened to the nasal cavity, where the fractures were

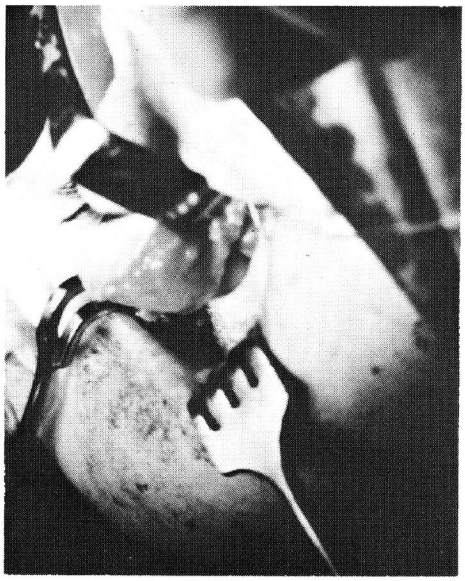

Fig. 2 Initial closure of soft tissues was opened to expose fracture segments of left orbital rim.

partially comminuted. The zygomatic bone was elevated and the tooth-bearing portion of the upper jaw was reduced by grasping it by the hand and forceps. After the tooth-bearing portion was in a satisfactory position, the fixation was carried out.

The continuity of the bilateral orbital rims and the left zygomatic portion were restored with direct transosseous wiring at the zygomatico-frontal, zygomatico-maxillary sutures and other portions of the comminuted midfacial fractures. The tooth-bearing portion of the maxilla was used in the technique of the arch bar ligated to the teeth, and the mandibular teeth were used in the technique of the continuous loop wiring. Following the reduction of the normal occlusion with the elastic traction, the intermaxillary wire fixation was performed. The midface was supported with bilateral craniofacial suspension wire fixation, which passed through the holes drilled in the zygomatic process of the frontal bone above the fractured line. The wires were attached to an arch bar on the maxillary teeth (Fig 3). After the fixation was performed, the soft tissue lacerations of the face were sutured (Fig 4).

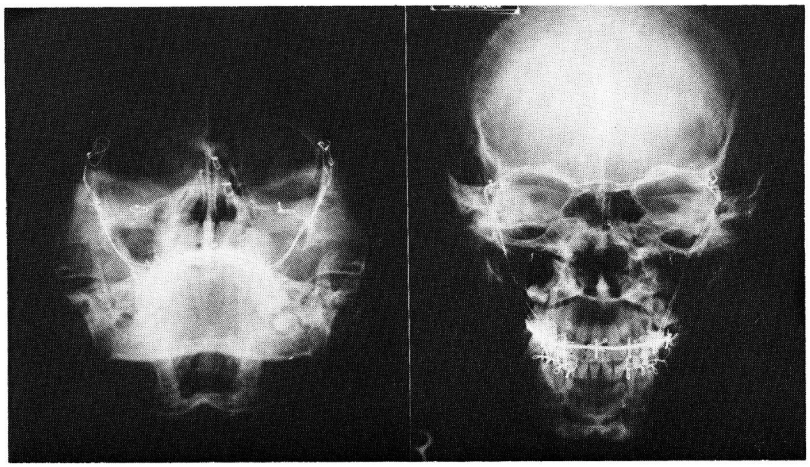

Fig. 3 Waters' projection (left) and posteroanterior projection (right) show continuity of orbital rims with direct transosseous wiring. Midface is supported with bilateral craniofacial suspension.

Fig. 4 Facial appearance with second closure of soft tissues after open reduction.

On one month postoperative day, the left funduscopic examination revealed no papilledema, and no retinal hemorrhage or edema. The left ocular movement was normal in all directions, and the visual activity was 1.2 on the left. The right orbit was then fitted with a prosthesis consisting of the artificial eye. On two month postoperative day, the intermaxillary fixation wires and the craniofacial suspension wires were removed. At this time, slight mobility was present in the maxilla. She was discharged from the hospital on May 24, 1975.

One year later, on inspection externally, she had slight flattening of the nasal roof, minimal scar of the face, slight anaesthesia in the left infraorbital nerve, no paralysis in the seventh cranial nerve, no damage to the nasolacrimal duct (Fig 5). On inspection intraorally, the maxilla was firm, she could open the mouth widely, and she had no interference with function of the mastication of food (Fig 6). Radiographic examination revealed a satisfactory restoration without any depressed sinus in the left maxilla (Fig 7).

Fig. 5 Patient's current facial appearance. She has prosthesis in right orbit.

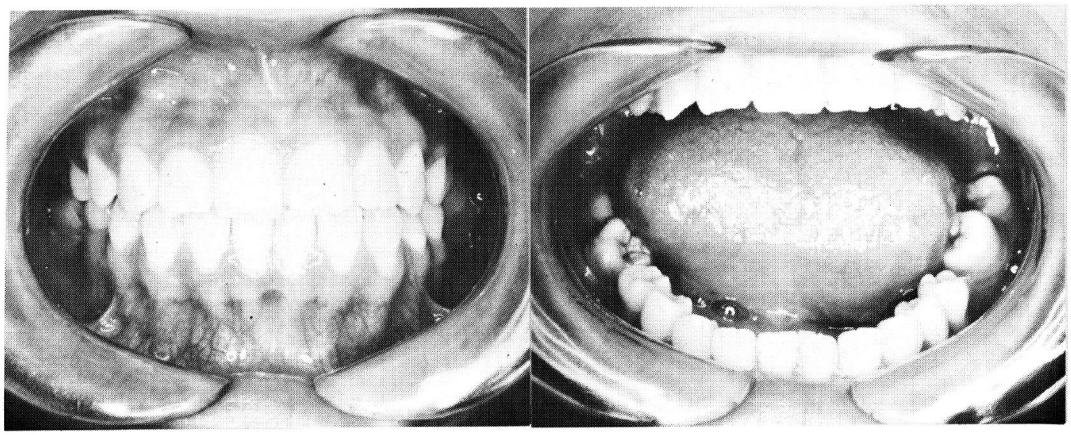

Fig. 6 Excellent postoperative occlusion (left). She can open the mouth widely (right).

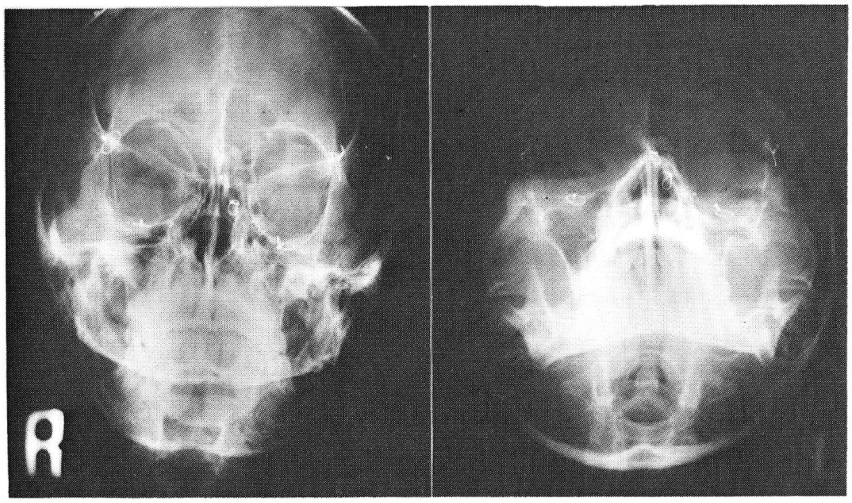

Fig. 7 Feuger's projection (left) and waters' projection (right) show continuity of orbital rims, but depressed sinus in left maxilla.

Summary

Many compound, comminuted midfacial fractures are associated with varying degrees of concomitant injuries, which involve the overlying soft tissues and such neighbouring structures as the head, the eyes, the nose, the paranasal sinus, and so on. Therefore, a complete physical evaluation is required to perform before the operation of the facial fractures, and treatment of concomitant injuries must be instituted by the appropriate members of the surgical team.[5]

A 17-year-old woman, who received a maxillofacial injury, was diagnosed as Le Fort III type fracture complicated by the rupture of the right eyeball. Seven days after the injury, her right eye was enucleated, and the soft tissue closures were opened in order to expose the fractured area widely. The shattered bony fragments were mainly reduced, so the continuity of the orbital rims and zygomatic portion were restored with direct transosseous wiring. The midface was supported with bilateral craniofacial suspension[6] attached to an arch bar on the maxillary teeth, and the intermaxillary wire fixation was performed for two month. The prosthesis in the right eye was fitted.

One year later, the external and intraoral inspection revealed that there was a satisfactory esthetic effect with minimal scar, left in her injured face, and that the function of her dental occlusion was restored.

Acknowledgements

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