—Report on Experiments and Clinical Cases—

The Use of a Biologically Absorbable Bone Pin Fixation for Nasal Fractures

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Abstract

After repairing a nasal fracture, it is customary to provide postoperative support for the nasal bone with intranasal, antibiotic-soaked gauze packing and an external splint. However, in cases of a skull base fracture with liquorrhea, this procedure is generally contraindicated because of the risk of infection.

To lessen this risk, the authors used a Biologically Absorbable pin which is ultimately absorbed by the body through the natural process of hydrolysis.

An intranasal support was inserted from outside the skin down to the maxilla. The operative results were satisfactory with no postoperative complications such as an inflammatory reaction or an infection.

(J Nippon Med Sch 2005; 72: 179–181)

Key words: nasal bone fracture, internal fixation, absorbable pin, liquorrhea, skull base fracture

Introduction

Nasal fractures are the most common fractures in the facial skeleton. The majority of nasal fractures have been managed by closed reduction and intranasal packing.

However, in cases of a skull base fracture with liquorrhea, this procedure is generally contraindicated because of the risk of a retrograde infection.

We present a new intranasal support using a Biologically Absorbable bone pin in this report. There was good reduction with no secondary deformity.

Materials and Methods

NEOFIX PIN® is a Biologically Absorbable bone pine made of Poly-L-Lactide Acid (**Fig. 1**). The forepart has equivalent or greater bending strength than bone, and is absorbed after about 3 years[1].

Closed reduction of the nasal bone was performed with Walsham forceps by the traditional method. A skin incision of about 3 mm is made in length on the dorsal side of the nose. From this point down to the maxilla, the nose is driven under the nasal bone with a drill. It is important to make a hole through the space between the nasal bone and the nasal membrane and to check the intranasal space while holding the drill pin in the hole so that there is no protrusion from this space. A Biologically Absorbable bone pin is inserted into this hole (**Fig. 2**). An external splint is used as usual.

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Fig. 1 a catalogue of NEOFIX PIN® (contributed by GUNZE COMPANY)
Various kinds of pin are shown.

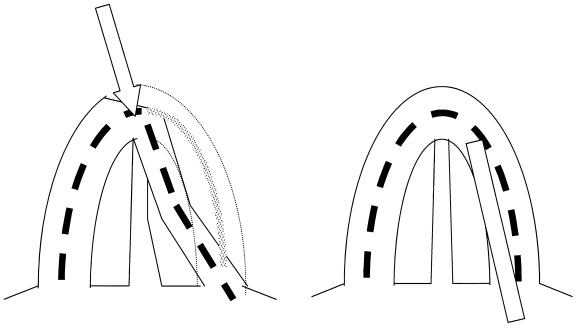

Fig. 2 a schema of an intranasal fixation
Closed reduction is performed and a hole is made in the direction of the arrow (left).
A Biologically Absorbable bone pin is inserted (right).

Fig. 3 pre-operative view
In appearance, the nose is caved in deformity and turned to the right.

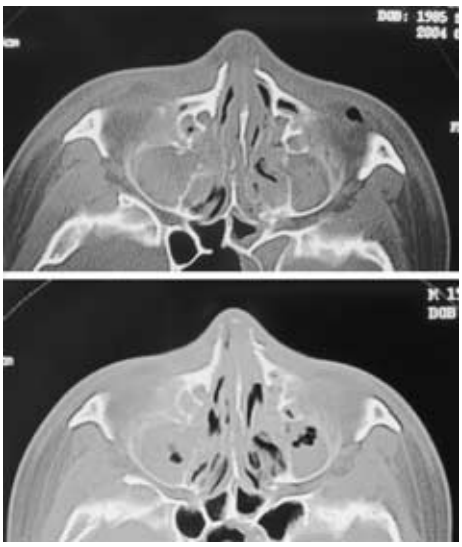

Fig. 4 CT (axial view)
Cave-in deformity in left wall of nasal bone (upper pre-operative).
Good results were achieved (lower post-operative, 3 days after operation).

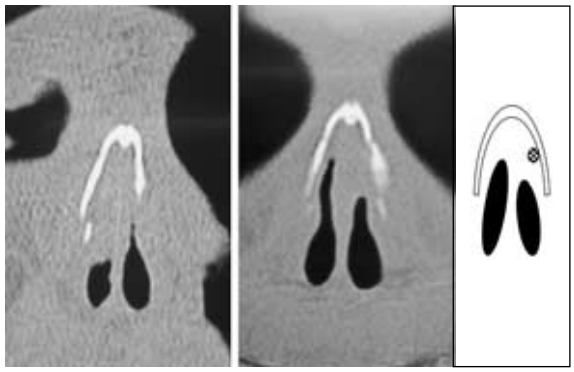

Fig. 5 CT (coronal view)
Left wall of nasal bone deviated to the right (left, pre-operative).
Good results were achieved (middle, post-operative, 3 days after operation).
Schema show the pin between nasal bone and nasal membrane A Biologically Absorbable bone pin is transparent on X ray photograph and CT (right post-operative).

Case

A 19-year-old man sustained a facial injury in a motorcycle accident, and was referred to our hospital on 8th October, 2004. There were lacerations to the face, pneumocephalus, skull base fracture, nasal bone fracture, maxilla fracture, and mandible fracture. In appearance, his nose was caved in on the left side and turned to the right (**Fig. 3**).

Computed tomography (CT) demonstrated fracture of the nasal bone (**Fig. 4, 5**).

Under general anesthesia, open reduction and internal fixation were made for facial fractures

Fig. 6 post-operative view (3 weeks after operation)
Good results were achieved cosmetically.

except the nasal fracture and a closed reduction of the nasal bone was performed with Walsham forceps on 14th October 2004. After that, a skin incision of about 3 mm in length was made on the dorsal side of nose. From this point down to the maxilla, the nasal bone was driven with a power drill, and a hole was made between the nasal bone and the nasal membrane with a manual drill, confirming no protrusion of the nasal membrane. NEOFIX PIN® (diameter 1.5 mm and length 20 mm) was inserted into this hole. This pin was buried under the skin and the skin was sutured. An external splint was used as usual.

Results

Good reduction and fixation were confirmed on CT 3 days after operation (**Fig. 4, 5**). There were no complications such as infection or secondary deformity during six months of observation. Moreover, minimal scar healing was achieved for the skin incision, and the operative results were satisfactory cosmetically (**Fig. 6**).

Discussion

The most common treatment of nasal fracture is closed reduction, intranasal packing, and external splint. Intranasal packing used for postoperative internal immobilization entails risks for patients who have a skull base fracture with liquorrhea. Therefore, secondary repair instead of early repair, skewer method[2,3] fixing septal cartilage or bone to the frontal process of the maxilla by Kirschner wire, or intercartilaginous incision and intranasal Kirschner wire splinting[4] are chosen. Toyota et al report an intranasal Kirschner wire suspension for nasal fractures[5]. The advantages of their method are; ① even with crushed maxilla, good stability is achieved; ② less bleeding and discharge; ③ nasal breathing is not disturbed; and ④ it is applicable for a patient who has a skull base fracture with liquorrhea. The disadvantages are; ① incision scar; and ② possibility of nasolacrimal injury (the authors have never experienced this).

By using a Biologically Absorbable bone pin instead of the Kirschner wire used in Toyota's report, we can achieve minimal scar healing and need not remove the pin after a long period.

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(Received, November 10, 2004)
(Accepted, December 6, 2004)