

## MAXILLOFACIAL PROTECTIVE HEADGEAR

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Recently we treated a patient for maxillofacial injuries sustained from falls while experiencing convulsive seizures. Because of the repeated episodes of trauma to the patient's head and face and his intractable seizures, a protective headgear was designed and fabricated. Because the patient desired to wear the headgear at all times, special consideration to the construction was necessary to allow the patient as much comfort and freedom as possible while still providing adequate protection. To date the patient has been very satisfied. He has fallen on his head and face while wearing the headgear and no injuries have occurred.

There has been little published on protective devices for the head and neck of individuals suffering from seizure disorders (1, 2). This paper describes the design and construction of the protective headgear and the results of its use.

### CASE REPORT

A 25-year-old white male was seen in the emergency room at St. Joseph's Hospital in Marshfield, Wisconsin for treatment of severe maxillofacial injuries which resulted from falling while experiencing a convulsive seizure. Examination revealed severe facial and oral lacerations, nasal bone fracture, mandibular symphysis fracture, maxillary anterior alveolar process fracture, and coronal fractures of several teeth.

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The patient's past medical history was essentially unremarkable with the exception that a major seizure disorder had been diagnosed in 1970. Different medications and dosages were tried without good control of the seizures. Unfortunately, the seizures occurred without warning which resulted in many severe falls and injuries.

After consulting with the patient's neurologist, it was decided that hospitalization would not be necessary and definitive treatment of the maxillofacial injuries was completed under local anesthesia on an outpatient basis. The treatment consisted of closed reduction of the nasal bone fracture, closed reduction of the maxillary alveolar process and mandibular fractures with establishment of intermaxillary fixation and closure of the multiple oral and facial lacerations.

The patient was evaluated weekly for the following five weeks. When he returned after the fifth week, the fracture appliances were removed. On the way home, the patient experienced a seizure and fell again sustaining severe maxillofacial injuries. He was brought to the Emergency Room and appropriate treatment rendered. It was decided to admit the patient to the hospital so that he would be in a controlled environment. Because the patient was a military veteran, he was transferred to a Veterans Administration Hospital.

Upon the patient's return to the Marshfield area, the injuries had healed satisfactorily. At that time it was suggested that a protective headgear be designed to prevent further injuries. The patient was quite receptive and a maxillofacial protective headgear to provide protection as well as comfort was designed and constructed by the Orthotic and Prosthetic Department at the Marshfield Clinic. To date the

patient has been very satisfied with the headgear. He and his relatives state that while seizures have continued, the headgear has prevented further maxillofacial injuries.

The problem in fitting a patient with a conventional all-plastic helmet is that they tend to be heavy and uncomfortably warm. Since the patient had a tendency to fall in the sagittal plane in either an anterior or posterior direction, a helmet had to be designed which would be light in weight and rigid enough to protect the frontal and occipital regions, the nose, and the mandible.

### FABRICATION OF HELMET

A prefabricated protective helmet was obtained from the J. A. Preston Corporation (71 Fifth Avenue, N.Y.). This helmet has felt padding on the inside with strap leather on the outside (Fig. 1). It has an adjustable chin strap



Fig. 1. Prefabricated helmet obtained from J. A. Preston Corporation. Reprinted by permission of © J. A. Preston Corp., 1974.

and can be obtained in circumferences from 18-in. to 25-in. in half-inch increments. It is recommended that the circumference measurement be taken just above the level of the ear. To reinforce the helmet and provide strength, Orthoplast (Johnson & Johnson, 501 George St., New Brunswick, N.J. 08903) was used. Because the patient had a problem with anterior falls, a face shield was also indicated. In addition the shield had to protect the patient's eyeglasses from impact while still permitting him to don the glasses easily. It was also important that his vision was not impaired by such a shield. After heating the Orthoplast to 160–170 deg. F. with a heat gun, it was wrapped circumferentially around the helmet, and corrugated slightly (Fig. 2). The Orthoplast

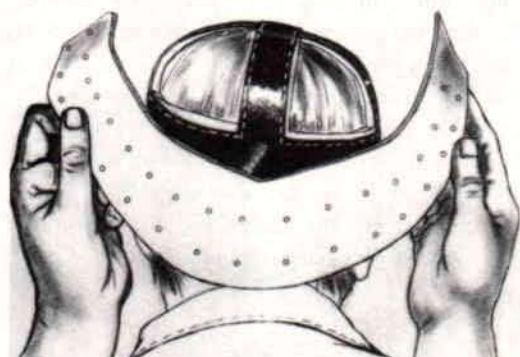


Fig. 2. Posterior view. The first shaped piece of heated Orthoplast being applied to the leather helmet.

was bonded to itself with a nonflammable spot remover. The helmet became rigid when it cooled. The occipital portion was brought low enough so that rigid support could be achieved. The rigid Orthoplast was molded to the helmet, and riveted in place. The impact of a fall on a specific point on the Orthoplast is spread throughout the whole ring of the Orthoplast, thus distributing the result of the impact over a broad area.

Another consideration was the protection of the mandible. An inferior bar had to be placed so that the mandible was protected against any impact that it received (Fig. 3). It had to be constructed in such a fashion that the jaw would



Fig. 3. Application of the corrugated Orthoplast® for protection of the mandible. Dotted line on the Orthoplast marks point where the first piece of Orthoplast was overlapped and sealed.

have full range of motion and permit the patient to eat without interference from the shield.

To achieve these results, two strips of Orthoplast, rolled in circular bars to give them strength, were attached to the Orthoplast covering the helmet's circumference. The superior bar was placed so that the patient had full visibility and at the same time full protection to his eyeglasses and nose (Fig. 4). The bars were



Fig. 4. Application of corrugated Orthoplast to protect face.

attached to the helmet with heat, spot remover, and rivets. To some degree the exact locations and dimensions of protective bars will vary with the size and shape of the anatomy of the facial features.

Since the patient has had the helmet (Figs. 5 & 6) he has experienced falls, and was well



Fig. 5. Frontal view of patient wearing protective headgear showing superior and inferior bars.



Fig. 6. Side view of patient showing relationship of the frontal protective bars.

protected from the impact by the protective headgear. To date, he has suffered no trauma to his head or face.

Reaction of the patient to the helmet has been very favorable. He has it by his bed, and near his person at all times so that he can put it on whenever he moves to the vertical position.

In summary, this helmet is light in weight, reinforced with Orthoplast, and with added face shield has protected this patient from injuries

from anterior or posterior falls. Corrugation of the Orthoplast is helpful in achieving a satisfactory degree of rigidity.

#### REFERENCES CITED

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