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The treatment of the condylar fracture of the mandible and the complications using conservative-orthopedic treatment

Leczenie złamań wyrostka kłykciowego żuchwy i powikłań metodą zachowawczo-ortopedyczną

INTRODUCTION

Condylar fractures of mandible occur as a result of direct or indirect injury in the surrounding chin, canine, or the opposite angle of the jaw joint. These fractures are common and constitute 15-36% of all mandibular injuries. Depending on the location of the fracture line, we identify three anatomical variations of condylar fractures: intracapsular, condylar neck fracture – or high subcondylar fracture – the fissure passes through the neck and condyle, low subcondylar fracture – fracture line runs at the base of condyle [1,2]. Currently, there are two treatment methods of mandibular condylar fractures: conservative-orthopedic and surgical. The most common method used is conservative-orthopedic. This preference is largely the result of three main factors. First, nonsurgical treatment gives "satisfactory" result in most cases. Second, there are no large series of patients reported in the literature who have been followed after surgical treatment. Third, the surgery of condylar fractures is difficult because of the inherent anatomical hazards [3]. The non-surgical treatment of condylar fractures in children has been usually recommended. In conservative treatment, the functional rehabilitation relies on the remodeling capacity of the joint. This is particularly the case in children, because the condyle is the remodeling center, thereby maintaining the normal integrity of the joint during growth. Some authors now have admitted the possibility of using surgical method, provided that the technique was minimally invasive. There is no consensus as regards the treatment of condylar fractures in adults. Basic requirements must be taken into consideration before the choice of treatment method such as: height and quantity of the fracture traces; uni- or bilateral fracture; total or partial loss of teeth; influence of the affected TMJ(s) on mandibular movements; degree and direction of dislocation of the condyles; difficulty of the surgical access; risk of lesion in critical anatomic structures; risk of hypertrophic and/ or cheloid scar; patients general health status; presence of other maxillofacial fractures; possibility of performing physical therapy; neuromuscular adaptations [4]. Conservative treatment involves repositioning of bone fragments and immobilizing fragments by the splint and intermaxillary traction for the period of 2 to 6 weeks. The next stage is a

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mechanotherapy and physiotherapy (1.5). Many authors emphasize that complications occur both in patients treated or not treated [4]. They occur in the form of opening limitation, mandibular deviation in the direction of fracture, pain in the joints, malocclusion, stiffness in temporomandibular joint, joining of bone-fracture.

Condylar fractures of the mandible are especially dangerous in children, because of the location of growth center. In the incidence of disturbed mandibular growth after condylar fractures in children can cause significant lower facial asymmetry with unilaterally reduction and flattening of the face on the side of fracture and shift toward the midline. [4-7].

A case report

The 16-year-old patient admitted to the Clinic of Maxillofacial Surgery with pain in the area of the right temporomandibular joint. She injured her chin as a result of falling downstairs.

Clinical examination revealed pain in the right temporomandibular joint, exacerbated during mandibular movements and pain during palpation. There was also limited jaw opening and mandibular deviation in the direction of the fracture.

The intraoral examination revealed fracture of the tooth 14. Radiography showed subcondylar fracture on the right side without displacement of bone fragments (Fig. 1).

Fig. 1

Conservative-orthopedic treatment was carried out. Individual splint with intermaxillary elastic traction for a period of 4 weeks was performed. The patient in this period was reported on regular every week visits. After the splint and interrmaxillary fixation had been removed the patient was referred to the Department of Prosthodontics, Medical University of Lublin to continuation of the treatment. After the orthopedic treatment the restriction of the mandibular opening to 30 mm was reported a well as the deviation in the direction of the joint of 5 mm and pain during movements of the mandible (Fig. 2).

Fig. 2

Mechanotherapy applied consisting of moving in the opposite side of the mandible to the damage, using language muscles as the target. Exercise consisted of shifting the tongue to the side opposite to the damaged side for 5 minutes twice a day. The patient was informed of the need to systematic exercise. After a period of two months of mechanotherapy the patient achieved normal range of jaw opening without deviating (Fig. 3). The patient currently remains under constant control in the Department of Dysfunction of TMJ. After a period of a year, the patient does not report any discomfort or pain, jaw movements are normal, radiography showed fusion of fracture, (Fig. 4)

Fig. 3, 4

DISCUSSION

Nature of mandibular condylar injury and the potential for healing varies with age. There are three groups of patients age in adolescence, due to the peculiar characteristics of the anatomical and physiological aspect of mandibular condyle. In the youngest age group (0-2 years), condylar neck is short and thin, it fulfills shallow articular fossa. The extensive vascularization of the condyle greatly increases vulnerability to a crushing injury. In the contrary to the older age groups short and stocky condylar neck is relatively more resistant to fracture. In the median age group of 3-12 years the articular configuration of the condyle resembles that of an adult. However, the potential for regeneration and remodeling still remains on high level. In the older age group (13-18 years) the capacity to new bone formation is similar to children but the capacity to condylar remodeling is less than the previous age group [8,9]. This may be the cause of abnormally shaped condylar head, shortened mandibular ramus height that may lead to persistent malocclusion.

Acute condylar trauma in adolescence can lead to long-term consequences, such as dysfunction of temporomandibular joint, abnormal jaw growth, ankylosis of temporomandibular joint. Disturbed mandibular growth as a result of condylar fractures with dislocation is a major problem in growing patients. In most cases, compensatory remodeling of the fractured condylar process allows to maintain proper and symmetrical development of the mandible. This refers mainly to children aged less than 10years,when the growth and remodeling potential is the greatest [10]. In some patients, directly after puberty may appear progressive asymmetrical development of the mandible, due to diminished capacity for development and remodeling on the side of the fracture. The condyle in this situation is abnormal and displaced from the fossa, but the function of the joint can remain intact. Ankylosis of temporomandibular joint is a rare complication of fractures of the mandible. Its occurrence is limited to patients under 10 years of age who have suffered heavy comminuted fractures of condylar process [11]. Many authors emphasize that in young patients, in which the injury was present, the incidence of dysfunction of temporomandibular joint increases with age [9,12].

CONCLUSIONS

Physicians should be aware of the implications of mandibular condylar fractures in young patients. Undiagnosed condylar injury in rare cases may cause adverse aftermath, which are more difficult to treat at a later age of the patient. Early diagnosis of condylar injures, proper treatment and regular follow-ups have the potential to reduce the likelihood of dangerous disorders of the mandibular growth and dysfunction of temporomandibular joint.

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SUMMARY

The fracture of the condyle process is one of the most common fractures of the mandible. These fractures constitute 15-36% of all mandibular fractures. Currently, there are two treatment methods of mandibular condylar fractures: conservative-orthopedic and surgical. The most common method used is conservative-orthopedic. The prevailing opinion earlier was that treatment of condylar fractures was free from complications. Nowadays, many authors emphasize that late complications such as malocclusion, mandibular hypomobility, deviation, disorders of the TMJ and pathological changes in the condyle may occur as the aftermath of this injury. The authors describe the treatment of the condylar fracture of the mandible and the complications using conservative-orthopedic treatment.

Keywords: mandibular fractules, conservative-orthopedic treatment, malocclusion, mandibular hypomobility

STRESZCZENIE

Złamania wyrostka kłykciowego żuchwy są najczęstszymi złamaniami żuchwy. Złamania te stanowią 15-36% wszystkich złamań żuchwy. Obecnie, posługujemy się dwiema metodami leczenia: zachowawczo-ortopedyczną i chirurgiczną. Najczęściej stosowaną metodą jest zachowawczo-ortopedyczna. Wcześniej uważano, że leczenie złamań wyrostka kłykciowego nie powoduje komplikacji. Obecnie wielu autorów podkreśla występowanie późnych powikłań w wyniku urazu. Powikłania te mogą się pojawić jako zaburzenia zgryzu, ograniczenie ruchów żuchwy, zbaczanie żuchwy, zaburzenia w stawie skroniowo-żuchwowym i zmiany patologiczne wyrostka kłykciowego. Autorzy przedstawili w pracy leczenie złamań wyrostka kłykciowego żuchwy i następowych powikłań metodą zachowawczo-ortopedyczną.

Słowa kluczowe: złamanie wyrostka kłykciowego, leczenie zachowawczo-ortopedyczne, zaburzenia zgryzu, ograniczenia ruchów żuchwy