

## Section 5. Medical science

## Секция 5. Медицина

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### **The formation of the elbow joint within chronic injuries in children**

**Abstract:** The work is devoted to the formation of the elbow joint in chronic fractures and fracture-dislocation of elbow joint in children in the untreated or improperly treated cases. The author describes feasibly stage and of the formation of the elbow joint. The work is based on clinical observations in 1954. The formation of the elbow joint in old cases has four consecutive stages. The severity of injury, especially the vascularization and growth of bone and cartilage structures determine the formation of the elbow joint.

**Keywords:** formation, elbow, joint, chronic, injuries, children

#### **Introduction.**

After any kind of injuries to the elbow joint, whether it was a fracture or dislocation if the treatment is carried out adequately, after a period of joint recovers completely without any complications [1, 7, 18, 22, 26,]. The situation is different when the injury is not treated at all (for various reasons) or treatment is carried out correctly (the so-called “folkbone-setter “). Chronic injuries of the elbow joint in children is a kind of a “cocktail” of anatomical and biomechanical changes [2, 3, 4, 6, 8, 11, 13]. Of great interest is the reconstruction of the elbow joint in the above cases. At first glance it seems that the outcome of each known injured bone structures of the elbow joint in the untreated or improperly treated cases [5, 10, 12, 16, 25]. Despite the fact that the joint is a three joint osteochondral structure them so intimately connected that a injured unit necessitates other injury. In addition, all of these pathological pro-

cesses occur in the context of a growing organism that is sure to affect the fate of the elbow. Our observations of age-old injuries of the elbow confirm these data, at the same time opened up new aspects of these complex lesions. Since the injury before the final formation of bone and cartilage structures of the elbow goes through several successive stages of development. Duration of the finish of the pathological process can drag on for several years. After reviewing the relevant literature data, we found no study devoted to the formation of the elbow joint, and we consider it appropriate to enlighten this area [14, 15, 17, 19, 20, 21, 23, 24].

What exactly is the formation of the elbow joint in a child's life? The process of recovery and growth of bone and cartilage structures of the elbow after no treatment or improper treatment of injuries. As we know, trauma interferes with the normal anatomy of the elbow joint, and need be to restore its structures. On this basis, to adequately reflect the recovery process, it is appropriate to use the term "formation of the elbow joint."

These injuries of the elbow occupy a leading position in chronic pathologies of childhood, making up 67% of all joints. Almost all chronic injury in adulthood appears osteoarthritis of the elbow. Disability in this case reaches 35%.

**The purpose of the research work.** To study mechanism of the formation of the elbow joint in chronic injuries.

#### **Materials and methods.**

At the Children's Hospital of Traumatology during the period of 2000–2010 treated 612 children in consultation department clinic counseled 1,342 children with age-old injuries of the elbow joint. Boys accounted for 65% and girls 35%. Right-handed injury prevailed, accounting for 67%. Patients up to three years of age accounted for 13%, from 4 to 7 were 38%, 8–15 years of age accounted for 49%. All patients received standard radiographic studies, multidetector spiral tomography performed for 58 patients. All radiographs are susceptible to radiographometry. Ultrasound examination of the elbow joint performed for 38 patients. Statistical data processing carried out on a personal computer.

#### **Results and discussion.**

As mentioned above, the formation of the elbow is in growing bone and cartilage structures of the elbow. This creates, in some cases a positive effect, restoring volume deficits. For example, an inadequate treatment of fractures of the humerus block observed its aseptic necrosis, but over time, if the degree of necrosis is low, the amount of power is restored completely. But in other cases the growth of bone and cartilage structures leads to volumetric expansion, for example, chronic dislocation radial head it is often observed due to the lack of physiological hypertrophy stimulator (humerus head\capitis of humerus).

By studying and analyzing the process of the formation of the elbow joint, we have divided it into four stages. In the four stages there is no sharp boundary, ie, one

step smoothly into the next. The first stage of destruction of the normal anatomy of bone and cartilage structures of the elbow, which arises as a result of the application of mechanical force. This step is a starting point in the formation of chronic injuries of the elbow when the treatment is not carried out, or is carried out inadequately.

The early stage of pathological biomechanics (Early: different types of traffic restrictions). In the process of fusion is commonly observed physiological limitation of movement. Vicious union leads to the volume deficit or a sliding block is complex. For example, a vicious union transcondylar fracture of the humerus in the position of extension due to the filling of bone callus fossa Olecranon, limited extension (deficit of the cubital fossa). In this case, the forced movement during the development of apex Olecranon observed spreading and increasing its transverse dimension that is atypical strain. Vicious union head of the condyle also leads to restriction of movement at the elbow creating a sliding block is complex. If there is a partial subluxation of diskongruentnost it eventually leads to a decrease in the thickness of the articular cartilage in the area of increased pressure (in closer contact of the articular surfaces).

Stage formed Pathology (Later). At this stage in the bone and cartilage structures observed aseptic necrosis, volume deficit and the volume strain. This stage is the final stage of anatomical changes.

Abnormal biomechanics (Later). At this stage of clinically manifest different types of instability, rigidity, and this is the final stage of the formation of the elbow joint after an untreated or improper treatment of fracture-bone of the elbow.

The formation of the elbow joint with slipped capital femoral epiphysis and epiphyseal separation of head of humerus (capitis humerus).

Isolated slipped capital femoral epiphysis and epiphyseal separation extremely rare. Usually these injuries unit joins the humerus fracture. This is due to the fact that the head is intimately connected with the condyle of humerus unit, moreover, that the lateral part thereof consists of cartilage due centric arrangement ossification nucleus. On the other hand, the angular disposition of the traumatic forces also play a role.

The outcome of slipped capital femoral epiphysis and isolated epiphyseal separation depends on the seam. With proper or acceptable adhesion of any deviation from the norm is observed.

In cases of improper splice with a cross or angular displacement without distal extension head of the condyle, in the following violations were observed. If there is a vicious union peripheral fragment in the distal direction there is a self-locking humeroradial joint. Subsequently, the observed displacement and volumetric deficits atypical strain condylar head and a head beam. In these cases, the elbow joint extends all the pathological formation step.

When there is nonunion, the outcome may be twofold: whether as a result, sub-acute circulatory deficiency (when the vascularization of the head of the condyle is

mainly due to the metaphyseal portion of the humerus) is observed avascular necrosis, or false joint head of the condyle (when the head of the condyle has an independent vascularization through the tendon vessels).

As a result of avascular necrosis observed volume deficits and deformity of the head of the condyle. But these effects on the function of the elbow joint is not adversely affected. But due to the premature closure of the growth zone is lagging distal-lateral aspect of the humerus, and there is valgus deformity of the elbow. If the degree of hallux valgus is very large, there are dislocation of the olecranon fossa of the ulna and surround conflict and contracture of the elbow.



Figure 1. Patient. A. 8 years old. After 2 years after surgical treatment for the chronic unknitted epiphyseal separation of head of humerus (capitis humerus). Explanation in the text.

In some cases, due to the loss of physiological support, head of radius hypertrophy or exposed to atypical strain often leads to contracture of the elbow.

When epiphyseal separation or slipped capital femoral epiphysis with a fracture of the condyle head unit with injury to the humerus vertical and horizontal areas of growth are observed volume deficits, and volume strain block the humerus due to avascular necrosis or stunting. Unit volume changes humerus certainly lead to contracture of the elbow joint (Fig. 1).

#### **Formation of elbow joint within injuries at block units of humerus.**

With isolated fractures of the humerus block often due to injury to the cartilage of the sprout and autonomy of vascularization observed growth retardation, aseptic

necrosis of the articular cartilage and volume deficit. Because of the volume deficit is not only limited to the movement of the elbow, but there is another phenomenon: during extensor-flexion movements olecranon makes reciprocating motion (antero-posterior instability) with respect to block the humerus. In extreme flexion increased pressure from the block on the coronoid process, and at the extreme unbending on the apex of olecranon. And thus increases the distance between the elbow and the coronoid process. Damaged the sphericity and the depth of the ulnar notch, and this exacerbates the subsequent contracture of the elbow (Figure 2).



Figure 2. Patient B, 14 y/o. Posttraumatic extensor-flexion contraction elbow joint. Atypic deformation incisura trochlearis, breach sphere, chronic dislocation forearm bones.

Formation of elbow joint within injuries in the proximal end of the forearm bones.

For fractures of the olecranon with residual out of angular offset frontal plane was originally created in the radial- ulnar joint subluxation. With the growth of angular deformation increases and sprains of the radial head anteriorly and laterally. Observed hypertrophy and volume deformation of the radial head, and excessive growth in the length of the radius. The above mentioned changes lead to a limitation of motion of the elbow joint.

When injury of Brecht, where no reduction is still front dislocation of the radial head are observed, as has been said above, hypertrophy and excess growth in length. Sometimes atypical volume strain is so pronounced that the dislocated head can not

straighten a native bed. Usually distorted and elongated head beam limits the movement of flexion (Figure 3).



Figure 3. Patient K, 12 y/o. Chronic dislocation forearm bones. Posttraumatic extensor-flexion contraction elbow joint. Atipic deformation head radius, breach sphere.

For fractures of the coronoid process is often observed hypertrophy and volume strain. The result is a volume limit conflict and elbow joint flexion (Figure 4).



Figure 4. Patient T, 10 y/o. Posttraumatic extensor-flexion contraction elbow joint. Atipic deformation processus Coronoideus.

Thus, the formation of the elbow joint in chronic lesions is the step-wise character and its final depends on many factors, the most injury and the characteristics of the vascularization of the injured structure, the intensity of growth of bone and cartilage structures and microorganism.

**Conclusions:**

1. Chronic injury to the elbow joint is a “cocktail” very advanced anatomical and biomechanical changes.

2. Despite the polymorphism of clinical manifestations of chronic injuries of the elbow joint, it is possible to predict the final results of the injury.

3. Between stages for chronic injuries of the elbow joint is no clear distinction, and one stage gradually merges into another.

4. Despite the serious violations of the correct choice of surgical treatment can improve the quality of life of patients.

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## **Potable water quality in the Karachunyvskyi reservoir**

**Abstract:** Practical experience of research, carried out in the SE ‘Dnipropetrovsk Medical Academy Ministry of Public Health of Ukraine’ covered results of ecological methods usage in the branch of preventive medicine. On the basis of Kryvyi Rig powerful iron mining enterprises (Ukraine) complex experimental research covered long-term foundation secondary landscapes on the dumps surface after mining exploitation process carried out. The poorer quality soils are dangerous for environment, surface- and groundwater and human health. Under the influence of dumps quality of water taken from Karachunyvskyi reservoir dropped wildly. Well water in the settlements, which are situated near the dumps, is forbidden for drinking purposes. Our data characterise priority in the sphere of potable water supply and main problem of water supply and potable water quality, actual for many regions of Ukraine, including Kryvorozskyi district — major rural part of Dnipropetrovskyi region, which population received potable water with deviations on some indicators from hygienic standards.

**Keywords:** chemical composition of water, over normal value, mineral components of water, potable water, centralizes, decentralizes sources.

**Background and Study Propose.** Since 1971, the CDC, EPA, and Council of State and Territorial Epidemiologists (CSTE) have maintained the collaborative national Waterborne Disease and Outbreak Surveillance System (WBD OSS) to docu-