

Our initial experiments in replacement extensive defects of bone tissue of shinbone with a new device

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Annotation:

The scientific work presents initial experiments on the replacement of widespread defects of bone tissue of long bones with a new device. A described technique is for restoring the length of limbs in defects by lengthening with a new device.

Objectivity: To analyze the efficiency of treatment posttraumatic, post-resection defects of long bones by using a new device in specialized department of bone-purulent complications

Materials and Methods:

The efficiency of new device was studied and analyzed (Patent #2703651, Patent #194945, Patent #193941, Russian Federation) during treatment of 8 patients with extensive defects of bone tissue of tibial shaft in specialized department of bone-purulent complications in 2019-2020. According to Gustilo-Anderson classification 6 patients had III A type, 2 patients had III B. According to J.W.May all patients had 4 type, it means the defect of tibial shaft is more than 6sm. The patients were divided into 2 groups. 1st group included 5 patients treated for open fracture with defect of shinbone diaphysis were healed by Ilizarov's classical method.

The other 3 patients were treated with help of a new device. 3(37,5%) of 8 patients were females and 5 (62,5%) were males. Division of patients according to age: 2 patients (25%) at 18-25, 3 patients (37,5%) at 26-35, 2 patients (25%) at 36-49, 1 (12,5%) patient is at more than 50.

5 (62,5%) patients were with posttraumatic defects of bone tissue of shinbone and 3 (37,5%) patients had post-osteomyelitis defect

The patients of 1st group, who had fractures of shin bone with defect of bone tissue of tibial, after trauma were applied skeletal extension system and passed preoperative preparation course for 3-10 days.

After preliminary preparation the surgery was performed: applying extra-focal device of external fixation without elimination of defect. After wound healing the second stage of surgery was performed: corticotomy, lengthening of proximal fragment of tibial bone with Ilizarov's device.

The patients with post-osteomyelitis defect of bone tissue of tibial after infection elimination were applied Ilizarov's device with the new device and corticotomy of proximal fragment of tibial. On 5-7 day after osteotomy (corticotomy) of bone started displacement of formed fragment in inter-fragment diastasis. The speed of displacement was 0,25mm 4 times a day.

Results of treatment:

During the treatment the patients with Ilizarov's device had some certain difficulties in lengthening process, if the lengthening was carried out in 4 bars, the lengthening are performed in 8 elements, if the lengthening is carried 4 times a day, the lengthening is performed 32 times in different parts. It creates certain difficulties.

The patients of second group due to distinctions of suggested device every time only one screw is prolonged and only 4 times during a day.

Conclusion:

1. Using pins and bar-screw provide stable and safe fixation of fragments of bone and less amount of puncture and scars. The construction ensures comfort and simplicity of distraction control and compatible with Ilizarov's device.
2. In the new device the measurable controllable two-sided motion of intermediate (distraction) support is executed by means of one driving element for transfer rolling moment ensuring the control over size of displacement by scales
3. The new device ensures the decrease of labour-intensiveness of distraction osteosynthesis, the comfort of exploitation for the doctor as well as for the patient; the control of displacement of osteotomy bone fragment and the support of control over size of displacement are simplified.
4. The device for building of bone defect can be manufactured in modern industrial enterprises/plants; moreover, it can be made up a set and used as a set with the **details of Ilizarov's device**.