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**THE RESULTS OF USING IMPROVED OSTEOSYNTHESIS FOR  
DIAPHYSEAL FRACTURES OF THE HUMERUS.**

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**Temurov Alisher Akmaljon ugli**

*assistant of the department,*

**Teshaev Temur Nematovich**

*assistant of the department,*

**Nigmatullaev Muhammadjon Nurali ugli**

*clinical ordinator,*

**Habibullaev Islamjon Ikromjon ugli**

*clinical ordinator,*

**Sobirov Ogabek Sobir ugli**

*clinical ordinator.*

*Samarkand state Medical University, Samarkand, Uzbekistan*

**ANNOTATION**

Diaphyseal fractures of the humerus are among the most common fractures, accounting for 13.5% of fractures of the tubular bones. Between 14.4% and 72% of these fractures are observed in working-age individuals aged 20 to 50 years (Askarova D.Sh., Grazdanov K.A., Barabash A.P. et al.). 2020).

The proportion of complications observed after treatment using various osteosynthesis methods exceeds 30% (Pankov I.O., Popova A.E., 2019). Today, with the growth of trauma, there is also an increase in severe types of injuries. The methods of osteosynthesis used for diaphyseal injuries are very numerous and diverse.

Currently, specialists are implementing minimally invasive, robust osteosynthesis methods with improved reproductive properties for diaphyseal fractures of the humerus.

**Keywords**

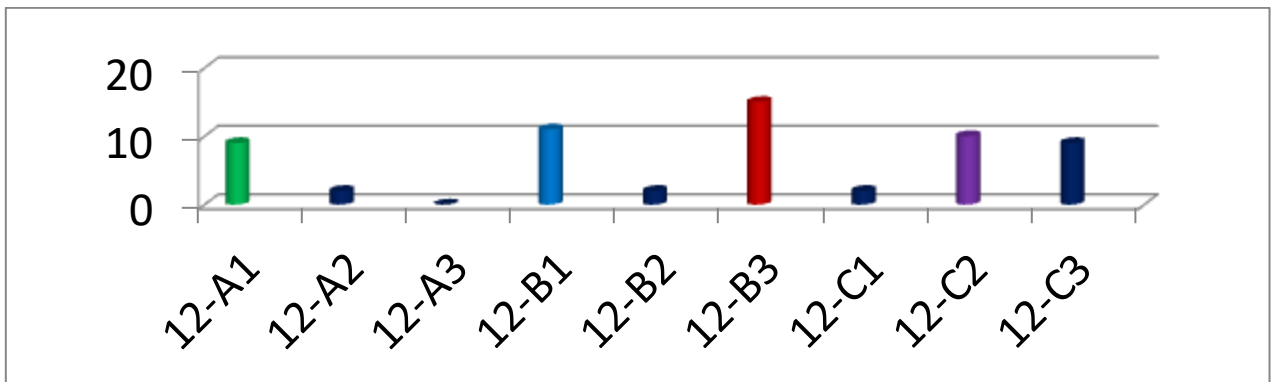
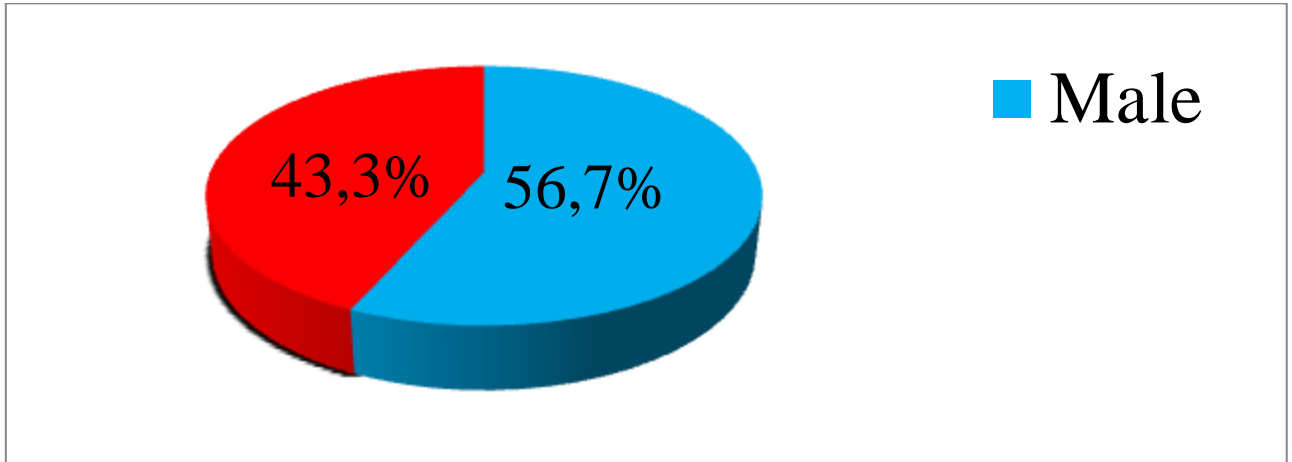
diaphyseal fractures of the humerus, intramedullary osteosynthesis of the forearm, metal osteosynthesis.

**Material and methods of investigation.**

This article is based on an analysis of the results of a study of 60 patients with diaphyseal fractures of the humerus who were treated in the Department of Adult Acute Injuries of the Samarkand Branch of the Republican Specialized Scientific and Practical Medical Center of Traumatology and Orthopedics from 2021 to 2024.

In this study, a standard examination method was used to examine patients with diaphyseal fractures of the humerus.

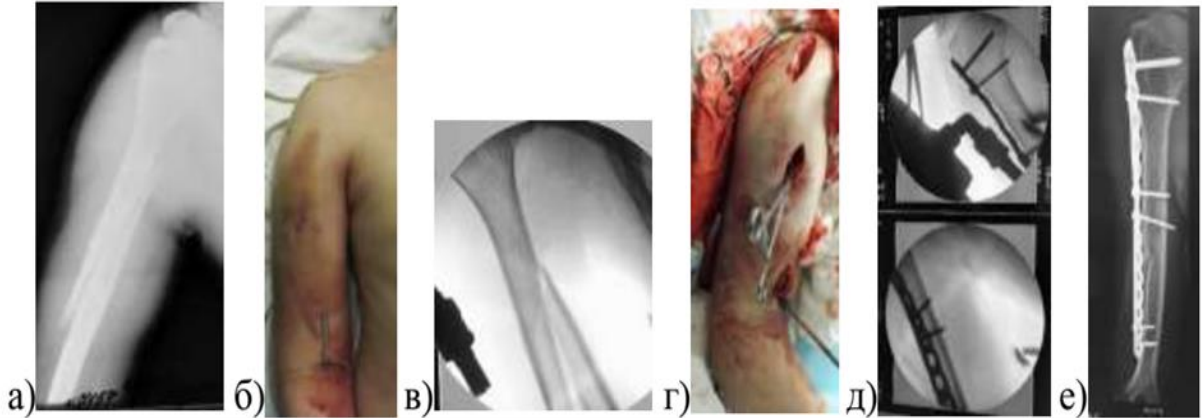
**Distribution of patients by gender:**



Classification of osteosynthetic associations: A - simple fractures; A1 is spiral. A2 - curved (> 30°). A3 - transverse (<30°). B-Cliv fractures. V1-fracture with a spiral wedge. B2 is a wedge-shaped bending fracture. B3 - wedge-shaped angular

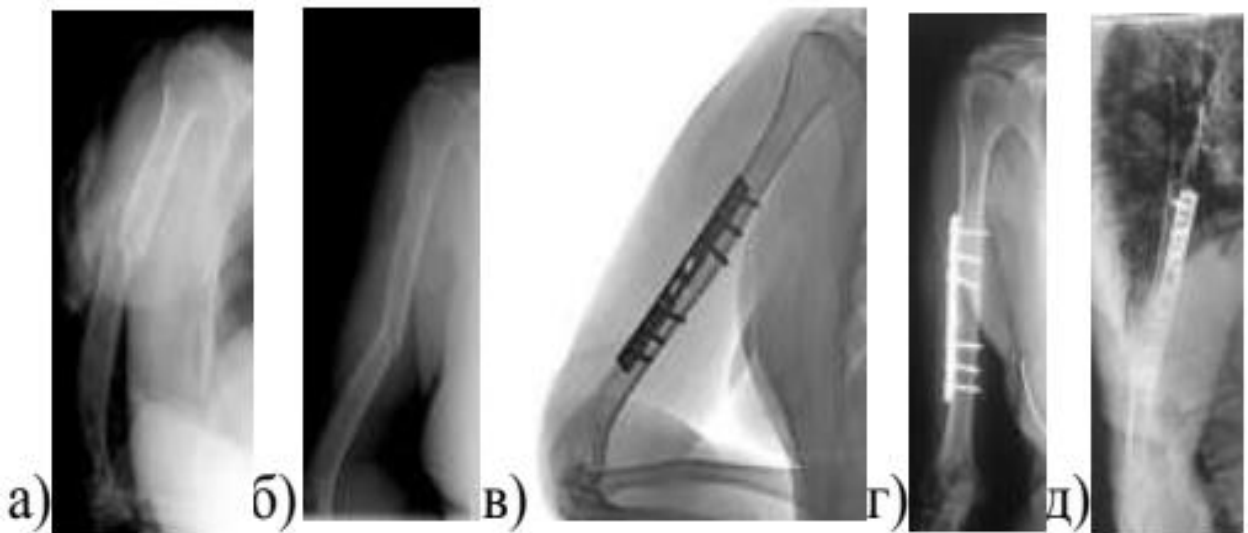
Groups	Patient age and gender								Total
	19-30 years old		31-40 years old		41-50 years old		51 older than		
	Male	Female	Male	Female	Male	Female	Male	Female	
Osteosensis with MOS in the main group	1	2	1	2	6	3	3	2	20
Control group - BIOS osteosynthesis			3	1	5	1	6	4	20
Control group traditional bone osteosynthesis	1	2	1	2	5	4	2	3	20
<b>Total</b>	<b>2</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>16</b>	<b>8</b>	<b>11</b>	<b>9</b>	<b>60</b>

fracture. S-Complex fractures. C1-spiral. C2 is sliced. C3 - multiple fragmentation fractures.



The result of open repositioning of the middle third fracture of the right humerus:

a, b - radiograph of the right humerus before surgery; v, g, d - X-ray of the right humerus after surgery;



Subjective data on the assessment of patients' functional movements and objective indicators were taken into account to assess the degree of recovery of traumatic shoulder disorders. DASH and Constant Shoulder Score scales were used for this purpose. The The Disabilities of the Arm, Shoulder, Hand (DASH) questionnaire assesses the patient's impairment of the function of their injured arm (Hudak P.L. et al., 1996).

This measurement is a questionnaire consisting of 30 questions about the patient's daily activities, which is carried out with high accuracy. The results are evaluated using a 100-point scale. Patients with low scores are considered to have good results. The measurement results allow us to evaluate the functional outcomes of treatment. At the same time, treatment outcomes are good from 0 to 25 points, satisfactory - from 26 to 50 points, and unsatisfactory - above 50 points.

Assessment of the complete restoration of the abdominal anatomy after surgery was performed using X-rays in two standard post-operative projections. At the same time, the restoration of the arm axis, its residual angular deformation, as well as secondary displacement along the width of the bones, were assessed.

Of the 20 patients in our study, 14 (70%) achieved shoulder axis restoration with residual angular deformation less than 50. Residual angular deformation from 50 to 100 was observed in 3 (15%) cases and from 100 to 150 in another 3 (15%) patients. In the first clinical group, less than 1/3 of the spinal diaphysis in the area of bone fractures was observed in 9 (45%) patients in the postoperative period, up to 2/3 of the diaphysis in 8 (40%) patients, and more than 2/3 of the diaphysis in 3 (15%) patients.

The gradual decrease in the number of DASH scores over time after surgical treatment is associated with a gradual decrease in the degree of limited range of motion of the injured hand in terms of the patient's ability to operate on machines, as well as a decrease in pain syndrome. The increase in scores on the Constant scale, along with a decrease in both daytime and nighttime pain, and an increase in the volume of movements, also manifested as an increase in the strength of the injured arm.

#### **Evaluation of the results of functional treatment in patients of the first clinical group using the DASH scale.**

After operation	Good	Satisfied	Unsatisfied	Total
5-7 days	-	4 (20%)	16 (80%)	20 (100%)
6 week	1 (5,9%)	8 (47,1%)	8 (47,1%)	17 (100%)
12 week	4 (25%)	10 (62,5%)	2 (12,5%)	16 (100%)
18 week	8 (53,3%)	5 (33,3%)	2 (13,3%)	15 (100%)
24 week	11 (73,3%)	4 (26,7%)	0 (0%)	15 (100%)

#### **A qualitative assessment of the functional outcomes of treatment in patients of the second clinical group according to the DASH scale.**

In the second group of patients, satisfactory functional outcome was observed in only one patient (4%) upon discharge from the hospital according to the DASH questionnaire. Within 6 weeks after surgery, 4 patients (22.2%) were satisfactory on the DASH scale. Within 12 weeks, positive results were observed in 10 (66.7%) patients according to the DASH scale.

At the end of the observation period, within 24 weeks, good results were achieved in 8 (61.5%) patients according to the DASH scale, satisfactory results



were achieved in 5 (38.5%) patients, and no unsatisfactory assessment of the patient's condition was recorded during the last repeat examination.

### CONCLUSIONS.

1. The most common surgical treatment methods for patients with fractures of the shoulder diaphysis: traditional and minimally invasive osteosynthesis with a plate, as well as blocking intramedullary osteosynthesis, have their own advantages and disadvantages, and there is no acceptable choice for choosing the best. Certain methods of minimally invasive periosteal osteosynthesis are considered promising, but they are associated with the risk of damage to the essential anatomical integrity of the shoulder, which necessitates the use of new methods and their justification from both anatomical and clinical perspectives.

2. The recommended methods for minimally invasive osteosynthesis of the shoulder bones are based on the topographic and anatomical structure of the convex plate, and its technology is anatomically developed and safe, preventing the risk of damage to the large vessels and nerves of the shoulder, as well as the involvement of the implant with the biceps muscle tendon.

3. The new method of minimally invasive spiral plate osteosynthesis (MOSP) demonstrated superiority in terms of the number of traditional types of extramedullary osteosynthesis (TNOS) and blocking intraosseous osteosynthesis (BIOS) and the overall number of complications, as well as in terms of operational effectiveness during surgery and the average duration of the operation.

4. The choice of a rational surgical treatment method for patients with diaphyseal fractures of the shoulder should be based on an assessment of the localization and nature of the fracture, the advantages and disadvantages of certain osteosynthesis methods, the likelihood of complications, as well as individual surgeon training and existing equipment.

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