

Title:

A Novel External Fixator to Facilitate Accurate and Efficient Fracture Treatment

Authors:

Mingkui Shen^{1,3}, Zizheng Ai^{1,4}, Jingna Li^{1,4}, Huaping Liang², Xieping Dong¹

1 Jiangxi Provincial People's Hospital Affiliated to Nanchang University, Nanchang, China

2 State Key Laboratory of Trauma, Burns and Combined Injury, Department of Wound Infection and Drug, Daping Hospital, Army Medical University, Chongqing, China

3 School of Medicine, Southern University of Science and Technology, Shenzhen, China

4 Jiangxi University of Traditional Chinese Medicine, Nanchang, China

Corresponding author:

Xieping Dong, Jiangxi Provincial People's Hospital Affiliated to Nanchang University, Aiguo Road 92, Donghu District 330006, Nanchang, China.

Tel: +8613576030901

E-mail: xpdongdoctor@163.com

Huaping Liang, State Key Laboratory of Trauma, Burns and Combined Injury, Department of Wound Infection and Drug, Daping Hospital, Army Medical University, Changjiang Road 10, Yuzhong District 400010, Chongqing, China

Tel: +8613638356728

E-mail: 13638356728@163.com

Table S1. The Nails Distance of Two Groups

Nail Distance	UJ group Mean $\pm$ SD	AO group Mean $\pm$ SD	p value
A	7.5 $\pm$ 0.30 mm	7.5 $\pm$ 0.16 mm	0.344
B	7.0 $\pm$ 0.02 mm	7.0 $\pm$ 0.02 mm	0.782
C	7.9 $\pm$ 0.02 mm	7.9 $\pm$ 0.03 mm	0.112
D	6.3 $\pm$ 0.02 mm	6.3 $\pm$ 0.02 mm	0.924
E	6.7 $\pm$ 0.01 mm	6.7 $\pm$ 0.01 mm	0.962

UJ, Universal joint fracture external fixation device; AO, Arbeitsgemeinschaft für Osteosynthesefragen fracture external fixation device.

Table S2. The Sagittal Nails Insertion Angle of Two Groups

Nail Insertion Angle	UJ group Mean $\pm$ SD	AO group Mean $\pm$ SD	p value
A	15.1 $\pm$ 0.16 °	15.1 $\pm$ 0.11 °	0.632
B	15.5 $\pm$ 0.10 °	15.9 $\pm$ 0.12 °	0.877
C	18.9 $\pm$ 0.12 °	19.2 $\pm$ 0.09 °	0.783
D	20.7 $\pm$ 0.14 °	20.5 $\pm$ 0.39 °	0.762
E	19.3 $\pm$ 0.11 °	19.2 $\pm$ 0.10 °	0.814

UJ, Universal joint fracture external fixation device; AO, Arbeitsgemeinschaft für Osteosynthesefragen fracture external fixation device.

Table S3. The Coronal Nails Insertion Angle of Two Groups

Nail Insertion Angle	UJ group Mean $\pm$ SD	AO group Mean $\pm$ SD	p value
A	30.8 $\pm$ 0.34 °	30.9 $\pm$ 0.27 °	0.863
B	33.8 $\pm$ 0.29 °	33.8 $\pm$ 0.30 °	0.735
C	70.6 $\pm$ 0.35 °	70.6 $\pm$ 0.29 °	0.983
D	50.3 $\pm$ 0.43 °	50.4 $\pm$ 0.39 °	0.699
E	41.8 $\pm$ 0.20 °	41.7 $\pm$ 0.23 °	0.831

UJ, Universal joint fracture external fixation device; AO, Arbeitsgemeinschaft für Osteosynthesefragen fracture external fixation device.

Table S4. The Horizontal Nails Insertion Angle of Two Groups

Nail Insertion Angle	UJ group Mean $\pm$ SD	AO group Mean $\pm$ SD	p value
A	30.8 $\pm$ 0.34 °	30.9 $\pm$ 0.27 °	0.863
B	33.8 $\pm$ 0.29 °	33.8 $\pm$ 0.30 °	0.735
C	70.6 $\pm$ 0.35 °	70.6 $\pm$ 0.29 °	0.983
D	50.3 $\pm$ 0.43 °	50.4 $\pm$ 0.39 °	0.699
E	41.8 $\pm$ 0.20 °	41.7 $\pm$ 0.23 °	0.831

UJ, Universal joint fracture external fixation device; AO, Arbeitsgemeinschaft für

Osteosynthese fraktur external fixation device.



Fig.S1 Demonstration of adult adaver femur fracture models. (A and B) Adult adaver femur specimens and radiography. (C) Adult adaver femur fracture models.