

The health economics results indicated that K-wires are less expensive and require significantly less operating time (median difference, 31 minutes; 95% CI, 28 to 35 minutes;  $P < .001$ ). Therefore, Prof Gray recommended the use of K-wires vs volar locking plates for patients who are able to undergo a closed procedure to repair a dorsally displaced fracture of the distal radius.

## POP Trial: Similar Functional Results in Each Treatment Method for Midshaft Clavicle Fractures

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Frans-Jasper G. Wijdicks, MD, PhD, Diakonessenhuis, Utrecht, The Netherlands, reported the results of the randomized controlled Surgical Treatment of Midshaft Clavicular Fractures With Dislocation trial [POP; NTR2438], which compared the short- and mid-term outcomes of plate fixation and intramedullary (IM) nailing. Midshaft fractures were the focus because 80% of all clavicle fractures occur in the midshaft region, and half of the fractures involve dislocation.

The trial was conducted in 4 medical centers in The Netherlands, and involved 120 patients aged 18 to 65 years. There were no significant differences in baseline characteristics between groups (Table 1).

The patients were randomized to treatment with plate fixation ( $n=58$ ) or IM nailing ( $n=62$ ). The intention-to-treat analysis with a 1-year follow-up assessed shoulder function postoperatively, using the Disabilities of the Arm, Shoulder, and Hand (DASH) and Constant-Murley scores. The primary end point was the 6-month DASH score.

The DASH and Constant-Murley scores did not differ significantly at 6 months (3.0 and 99.2 for the plate group, and 5.6 and 95.5 for the IM group, respectively) and 1 year. However, measurement of the area under the curve for the DASH score between 6 weeks and 6 months was significantly different and favored plate fixation ( $P=.02$ ).

Open reduction of fracture occurred in all 58 cases in the plate fixation group and in 46 of 62 cases (75%) in the IM nailing group. Conversion from one technique to the other occurred in 6 cases in the IM nailing group due to technical difficulties and 1 case in the plate fixation group due to a communication error. One case of nonunion occurred in the plate fixation group and 2 IM implants failed. No cases of malunion occurred. No neurovascular complications were evident. One plate fixation implant broke.

Major complication rates were low. However, minor complications were numerous and mainly related

Table 1. Baseline Characteristics

Baseline	Plate Fixation (n = 58)	Intramedullary Fixation (n = 62)
Age, y	38.3	39.1
Men, %	92	97
Body mass index, kg/m <sup>2</sup>	24.7	23.7
Trauma mechanism, %		
Traffic accident	48	40
Sports	31	47
Fall from height	21	13

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Table 2. Complications

Complication	Treatment	Plate Fixation	Intramedullary Fixation
Implant breakage	Revision surgery	1 (2)	0
Implant failure	Revision surgery	0	2 (3)
Nonunion	Revision surgery	1 (2)	0
Malunion	Revision surgery	0	0
Refracture after removal	Revision surgery	2 (3)	0
Irritation	Removal of implant	12 (21)	33 (53)

Data are presented as no. (%).

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to irritation caused by the implants that necessitated implant removal, which involved 12 of 58 cases (21%) in the plate fixation group and 33 of 62 (53%) cases in the IM nailing group (Table 2).

By 12 months, implant-related irritation was present in only 3% and 6% of patients in the plate fixation and IM nailing groups, respectively. To deal with implant irritation, the researchers recommend removal of the titanium elastic nail, generally under local anesthesia. Future research will focus on reducing irritation and the need for conversion.

Postoperative shoulder function at 6 months and 1 year were similar; patients treated using the plate fixation implant recovered faster than patients in the IM nailing group up to 6 months postoperatively, but ultimately both groups recovered to a similar degree. Although major complications were few, implant-related complications were frequent, mainly involving irritation, and were typically treated by removal of the implant.