

Non-Unions and Delayed Unions Treated in the Trauma Center Meidling

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Non-Unions and Delayed Unions

353 patients

64 referring hospitals and physicians

113 female

240 male

mean age: 45 years (12-91)

Patient Collective

198 diaphyseal fractures

155 cancellous bone fractures

81 conservative treatment

272 ORIF (149 once, 69 twice, 54 thrice or more)

127 metal in place

37 deep wound infections (osteomyelitis)

Non-Unions/Delayed Unions Anaesthesia

number	general	lumbar	plexus	local
353 (100%)	186 (53%)	101 (28%)	51 (15%)	15 (4%)

Surgery before ESWT

none	1 x	2 x	3 x	> 3 x
81 (23%)	149 (42%)	69 (20%)	23 (6%)	31 (9%)

Non-Unions/Delayed Unions

region	number	non union	delayed union
tibia	107	81	26
scaphoid	57	40	17
femur	49	46	3
humerus	31	20	11
radius	24	15	9
foot	22	13	9
ulna	23	11	12
hand	17	2	15
fibula	12	7	5
pelvis	7	5	2
femoral neck	4	4	
TOTAL	353	244 (69%)	109 (31%)

region	number (treatments)	osseous healing	persistent non-union
pelvis	7 (8)	6 (86%)	1 (14%)
fibula (ankle)	12 (13)	10 (83%)	2 (17%)
hand	17 (19)	15 (88%)	2 (12%)
tibia	107 (127)	87 (81%)	20 (19%)
femoral neck	4 (4)	3 (75%)	1 (25%)
radius	24 (29)	20 (83%)	4 (17%)
femur	49 (55)	34 (69%)	15 (31%)
foot	22 (24)	16 (73%)	6 (27%)
scaphoid	57 (60)	37 (65%)	20 (35%)
ulna	23 (28)	14 (61%)	9 (39%)
humerus	31 (38)	19 (61%)	12 (39%)
TOTAL	353 (405)	261 (74%)	92 (26%)

Age of Non-Unions

	total	bony fusion	persistent non-union
delayed union	109 (31%)	86 (79%)	23 (21%)
non-union	244 (69%)	175 (72%)	69 (28%)
TOTAL	353 (100%)	261 (74%)	92 (26%)

Quality of Non-Unions

	number	bony fusion	persistent non-union
oligotrophic / atrophic	209 (59%)	149 (71%)	60 (29%)
hypertrophic	107 (30%)	84 (78%)	23 (22%)
infected non-unions	37 (11%)	28 (76%)	9 (24%)
TOTAL	353 (100%)	261 (74%)	92 (26%)

Infected Non-Unions

infected non-unions	number (treatments)	bony fusion	persistent non-union
tibia	27 (34)	21 (78%)	6 (22%)
femur	5 (5)	4 (80%)	1 (20%)
scaphoid	1 (2)		1 (100%)
radius	1 (1)	1 (100%)	
ulna	1 (1)		1 (100%)
fibula	1 (1)	1 (100%)	
humerus	1 (2)	1 (100%)	
TOTAL	37 (46)	28 (76%)	9 (24%)

Double Treatment

region	number	bony fusion	persistent non-union
tibia	20	11 (55%)	9 (45%)
femur	6	1 (17%)	5 (83%)
radius	5	4 (80%)	1 (20%)
humerus	7	6 (86%)	1 (14%)
ulna	5	2 (40%)	3 (60%)
scaphoid	3	2 (67%)	1 (33%)
foot	2		2 (100%)
hand	2		2 (100%)
pelvis	1	1 (100%)	
fibula	1		1 (100%)
TOTAL	52	27 (52%)	25 (48%)

Summary

1. 74% osseous union
2. pain reduction
3. no vascular or nerve damage
4. no provocation of infection
5. non-invasive
6. more economic than operative treatment

Conclusion

According to these results, we consider ESWT as the first choice in treating delayed or non-unions, not needing surgical correction.