Prospective Randomized Controlled Trial: Early Weight Bearing After Conservative Treatment of Weber B Ankle Fractures

Robert C. Stassen, MD; Stijn Franssen, MD; Erik De Loos, MD; Berry Meesters, MD; Bert Boonen, DMed; Raoul Van Vugt, MD, PhD Zuyderland MC, Heerlen, Netherlands

Purpose: The Weber B fracture is the most common among malleolar fractures. AO guidelines suggest non–weight-bearing with a cast for 4 to 6 weeks. Previous studies have shown weight bearing to be a safe treatment for stable Weber B fractures; however, these studies had low-quality evidence. Our aim was to compare mobilization and weight bearing to immobilization and non–weight-bearing.

Methods: All patients, 16 years and older, with an isolated Weber B fracture (Lauge Hansen supination-eversion stage 2-4A) and congruent ankle mortise in primary radiographs were screened. After assessment of ankle stability on weight-bearing radiographs, patients were randomized between mobilization and weight bearing with a walker (intervention group) and immobilization and non–weight-bearing with a cast (control group). Primary outcome measure was the Olerud-Molander Ankle Score (OMAS). Secondary outcome measures were displacement of fracture after 6 weeks (based on radiographs), range of motion of the ankle, calf circumference, and the 36-Item Short Form Survey (SF-36). Follow-up was planned at 1, 6, and 12 weeks after trauma.

Results: Baseline OMAS was comparable between both groups. A 30-point difference (P<0.001)

on a 0-100 scale was observed between study arms after 6 weeks and a 10-point difference (P = 0.015) was observed after 12 weeks. Patients randomized to the walker group scored significantly better on SF-36 after 6 and 12 weeks compared to the cast group. Range of motion was significantly better (P<0.001) after 6 weeks of weight bearing. This difference was leveled out after 12 weeks (P>0.05). No radiological displacement was observed in any patient.

Conclusion: The current AO guideline for stable Weber B fractures is outdated. Weight bearing using a walker is a safe and patient-friendly treatment for patients with stable Weber B ankle fractures.

Factor General (In-49) Control group (n-22) Intervention group (n-24) Significance (p-valimation of the product of the produ	Factor	General (n=49)	Control group (n=25)	Intervention group (n=24)	Significance (n-valu
DMAS baseline (median (10,R)) 100 (100-100) 100 (100-100) p = 0.001 DMAS weeks (Median (10,R)) 55 (40-7) 70 (58-80) p = 0.015 ROM baseline (Median (10,R)) 55 (26-42) 36 (27-42) 35 (26-43) p = 0.015 ROM baseline (Median (10,R)) 55 (26-42) 36 (27-42) 36 (26-33) p = 0.001 ROM baseline (Median (10,R)) 15 (26-53) 50 (48-53) 50 (48-57) p < 0.001 Baseline v6 weeks (Median (10,R)) 15 (46-56) 50 (46-53) 50 (48-57) p < 0.001 Baseline v6 week (Monu-up** P 0.001 p > 0.001 p > 0.001 P< 0.001 P< 0.001 Role Umatations due to physical problems (significance) p = 0.017 p = 0.027 p > 0.001 P< 0.021 Role Umatations due to emotionel problems (significance) p = 0.017 p = 0.023 P< 0.021 P< 0.025 P< 0.021 P< 0.02		General (II=45)	cond or group (n=25)	intervention group (n=24)	Significance (p-valu
DMAS & weeks (Median (10,R)) 55 (40-71) 40 (30-55) 70 (65-80) p < 0.01 DMAS 12 weeks (Median (10,R)) 35 (26-22) 36 (27-42) 35 (26-43) p < 0.01		100 (100-100)	100 (100-100)	100 (100-100)	1
OMAS 12 weeks (Median (IQR)) 80 (60-90) 7 5 (43-80) 85 (64-95) p = 0.015 ROM baseline (Median (IQR)) 35 (26-42) 35 (27-42) 35 (26-43) 48 (42-52) p < 0.001					n < 0.001
ROM baseline (Median (IQR)) 35 (26-42) 36 (27-42) 35 (26-43) ROM 2 weeks (Median (IQR)) 35 (26-50) 32 (28-44) 48 (42-52) $p < 0.001$ ROM 2 weeks (Median (IQR)) 51 (46-56) 50 (46-53) 54 (48-57) $p < 0.001$ Quality off ife Baseline (is Given Lip)** $p = 0.002$ $p > 0.001$ $p > 0.001$ Robe Limitations due to physical problems (significance) $p = 0.002$ $p > 0.001$ $p > 0.001$ Robe Limitations due to bemosionel problems (significance) $p = 0.001$ $p = 0.001$ $p = 0.001$ $p = 0.001$ Robe Limitations due to bemosionel problems (significance) $p = 0.001$ $p = 0.001$ $p = 0.002$ $p = 0.002$ Robe Limitations due to bemosionel problems (significance) $p = 0.001$ $p = 0.002$ $p = 0.002$ Robe Limitations due to bemosionel problems (significance) $p = 0.001$ $p = 0.002$ $p = 0.002$ Robe Limitations due to bemosionel problems (significance) $p = 0.007$ $p = 0.020$ $p = 0.020$ Robe Limitations due to bemosionel problems (significance) $p = 0.007$ $p = 0.004$ $p = 0.004$ Social functioning (significance) $p = 0.007$ $p = 0.004$ <					1°
ROM 6 weeks (Median (10,R)) 43 (30-50) 32 (28-44) 48 (42-52) p < 0.001 ROM 12 weeks (Median (10,R)) 51 (46-56) 50 (46-53) 54 (48-57) p < 0.001	CHIRS II WEEKS (WEGIST (I C(I))	00 (00-50)	75(45-00)	05(04-55)	p=0.015
ROM 6 weeks (Median (IQ,R)) 43 (30-50) 32 (28-44) 48 (42-52) p < 0.001 ROM 12 weeks (Median (IQ,R)) 51 (46-56) 50 (46-53) 54 (48-57) p < 0.001	ROM baseline (Median (IOR))	35 (26-42)	36 (27-42)	35 (26-43)	
ROM 12 weeks (Median (UQR)) \$1 (46-56) \$0 (46-53) \$4 (48-57) Quality of life $= 0.002$ $p > 0.001$ $p > 0.001$ Baseline or 6 weeks (Jolow-up**) $p = 0.002$ $p > 0.001$ $p > 0.001$ Physical functioning (significance) $p = 0.001$ $p > 0.001$ $p = 0.002$ Bode Limitations due to physical problems (significance) $p = 0.001$ $p = 0.002$ Emotional well-being (significance) $p < 0.001$ $p = 0.032$ Social functioning (significance) $p < 0.001$ $p = 0.022$ Social functioning (significance) $p < 0.001$ $p = 0.022$ Sweek ss 12 week follow-up** $p = 0.007$ $p = 0.020$ Role Limitations due to physical problems (significance) $p = 0.007$ $p = 0.020$ Role Limitations due to emotionel problems (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to emotionel pro					n < 0.001
Quality of life Baseline us 6 week follow-up** Physical functioning (significance) Role Limitations due to physical problems (significance) Role Limitations due to physical problems (significance) P = 0.001 Role Limitations due to physical problems (significance) P = 0.001 Social functioning (significance) P = 0.001 P = 0.002 General health (significance) Sweek vs. 12 week follow-up** Physical functioning (significance) Role Limitations due to emotionel problems (significance) Role Limitations due to emotionel problems (significance) P = 0.007 Role Limitations due to emotionel problems (significance) P = 0.007 Role Limitations due to emotionel problems (significance) P = 0.007 Role Limitations due to emotionel problems (significance) P = 0.007 Role Limitations due to emotionel problems (significance) Role Limitations due to emotionel problems (significance) <					p · oroox
Boseline is 6 week follow-up**Physical functioning (significance) $p = 0.02$ $p > 0.001$ Role Limitations due to physical problems (significance) $p = 0.017$ $p = 0.042$ Berery (significance) $p = 0.017$ $p = 0.039$ Emotional well-being (significance) $p < 0.001$ $p = 0.039$ Banisting ficance) $p < 0.001$ $p = 0.039$ Social functioning (significance) $p < 0.001$ $p = 0.039$ Banisting ficance) $p < 0.001$ $p = 0.032$ General health (significance) $p = 0.007$ $p = 0.007$ Role Limitations due to physical problems (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to physical problems (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to to motionel problems (significance) $p = 0.039$ $p = 0.031$ Social functioning		•			•
Physical functioning (significance) Role Limitations due to physical problems (significance) Role Limitations due to emotionel problems (significance) Role Limitations due to emotionel problems (significance) P = 0.039 $p = 0.039$ Social functioning (significance) Romeral health (significance) $p < 0.001$ P = 0.032 $p = 0.032$ Social functioning (significance) Romeral health (significance) $p < 0.001$ P = 0.032 $p = 0.032$ Social functioning (significance) Romeral health (significance) $p < 0.001$ P = 0.025 $p = 0.025$ Social functioning (significance) Role Limitations due to physical problems (significance) Emotioning (significance) $p = 0.007$ 	Quality of life				
Role Limitations due to physical problems (significance) $p = 0.01$ $p > 0.001$ Role Limitations due to to disolve problems (significance) $p = 0.017$ $p = 0.042$ Emotional well-being (significance) $p = 0.001$ $p = 0.032$ Social functioning (significance) $p < 0.001$ $p = 0.032$ Social functioning (significance) $p < 0.001$ $p = 0.032$ Sweek ss 12 week follow-up** $p < 0.001$ $p = 0.027$ Role Limitations due to physical problems (significance) $p = 0.007$ $p = 0.020$ Role Limitations due to physical problems (significance) $p = 0.007$ $p = 0.020$ Role Limitations due to physical problems (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to to motionel problems (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to to motionel problems	Baseline vs 6 week follow-up**				
Role Limitations due to emotionel problems (significance) $p = 0.07$ $p = 0.042$ Energy (significance) $p = 0.039$ Social functioning (significance) $p < 0.001$ $p = 0.032$ Beni (significance) $p < 0.001$ $p = 0.032$ Beni (significance) $p < 0.001$ $p = 0.025$ General health (significance) $p = 0.007$ Role Limitations due to physical problems (significance) Sweek vs. 12 week follow-up ** $p = 0.012$ $p = 0.020$ Energy (significance) $p = 0.012$ $p = 0.020$ Energy (significance) $p = 0.044$ Social functioning (significance) Energy (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.031$ $p = 0.031$ Role Limitations due to physical problems (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to emotionel problems (significance) $p = 0.049$ $p = 0.031$ Role Limitations due to emotionel p	Physical functioning (significance)		p = 0.002	p > 0.001	
Energy (significance) $p = 0.039$ Emotion well-being (significance) $p < 0.001$ $p = 0.032$ Pain (significance) $p < 0.001$ $p = 0.032$ Social functioning (significance) $p < 0.001$ $p = 0.025$ Sweek ss 12 week follow-up** $p = 0.007$ Role Limitations due to physical problems (significance) Role Limitations due to emotionel problems (significance) $p = 0.012$ $p = 0.020$ Emergy (significance) $p = 0.049$ Emotional (significance) Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.046$ Baseline us 12 week follow-up** $p = 0.039$ $p = 0.031$ Physical functioning (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to emotionel problems (significance) $p = 0.049$ Emotional well-being (significance) Social functioning (significance) $p = 0.049$ Emotional well-being (significance) <td>Role Limitations due to physical problems (significance)</td> <td></td> <td>p=0.001</td> <td>p > 0.001</td> <td></td>	Role Limitations due to physical problems (significance)		p=0.001	p > 0.001	
Emotional vell-being (significance) $p < 0.001$ $p = 0.032$ Social functioning (significance) $p < 0.001$ $p = 0.032$ General health (significance) $p < 0.001$ $p = 0.032$ Sweek vs.2 week (noisw-yr*) Physical functioning (significance) $p = 0.007$ Role Limitations due to emotionel problems (significance) $p = 0.002$ $p = 0.020$ Emergy (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.046$ Role uthatistors due to physical problems (significance) $p = 0.007$ $p = 0.046$ Role uthatistors due to physical problems (significance) $p = 0.039$ $p = 0.031$ Role uthatistors due to emotionel problems (significance) $p = 0.039$ $p = 0.031$ Emoty (significance) $p = 0.049$ Social functioning (significance) Social functioning (significance) $p = 0.049$ S	Role Limitations due to emotionel problems (significance)		p = 0.017	p = 0.042	
Social functioning (significance) $p < 0.001$ $p = 0.032$ Pain (significance) $p < 0.001$ $p = 0.025$ Several health (significance) $p = 0.007$ Role Limitations due to physical problems (significance) $p = 0.012$ $p = 0.020$ Role Limitations due to emotionel problems (significance) $p = 0.012$ $p = 0.020$ Role Limitations due to emotionel problems (significance) $p = 0.007$ $p = 0.020$ Rontonal Veel-Brieg (significance) $p = 0.007$ $p = 0.040$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Recel matiations due to physical problems (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to emotionel problems (significance) $p = 0.039$ $p = 0.031$ Recel Limitations due to emotionel problems (significance) $p = 0.049$ Emotional Weil-Brieg (significance) Social functioning (significance) $p = 0.049$ $p = 0.049$ $p = 0.049$	Energy (significance)		p=0.039		
Pain (significance) $p < 0.001$ $p = 0.025$ General health (significance) $p = 0.007$ $P = 0.020$ Role Umitations due to physical problems (significance) $p = 0.012$ $p = 0.020$ Role Umitations due to physical problems (significance) $p = 0.007$ $p = 0.020$ Berryr (significance) $p = 0.009$ $p = 0.049$ Emotional well-being (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.039$ $p = 0.031$ Role Umitations due to physical problems (significance) $p = 0.039$ $p = 0.031$ Role Umitations due to emotionel problems (significance) $p = 0.049$ $p = 0.031$ Social functioning (significance) $p = 0.049$ $p = 0.049$	Emotional well-being (significance)				
General health (significance) p=0.007 Sweek vs 12 week follow-up** p=0.007 Physical functioning (significance) p=0.012 p=0.020 Role Limitations due to physical problems (significance) p=0.012 p=0.020 Role Limitations due to physical problems (significance) p=0.044 p=0.044 Social functioning (significance) p=0.007 p=0.046 Bancipier (significance) p=0.007 p=0.046 Social functioning (significance) p=0.031 Role Limitations due to physical problems (significance) Role Limitations due to physical problems (significance) p=0.039 p=0.031 Role Limitations due to emotionel problems (significance) p=0.049 p=0.031 Role Limitations due to emotionel problems (significance) p=0.039 p=0.031 Role Limitations due to emotionel problems (significance) p=0.049 p=0.049	Social functioning (significance)		p<0.001	p = 0.032	
Sweek so 12 week follow-up** $p = 0.007$ Physical functioning (significance) $p = 0.012$ $p = 0.020$ Role Limitations due to emotionel problems (significance) $p = 0.012$ $p = 0.020$ Emotional well-being (significance) $p = 0.049$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.044$ Social functioning (significance) $p = 0.007$ $p = 0.046$ Baseline us 12 week follow-up** Physical functioning (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to physical problems (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to emotionel problems (significance) $p = 0.039$ $p = 0.031$ Emotional well-being (significance) $p = 0.049$ $p = 0.049$	Pain (significance)		p < 0.001	p = 0.025	
Physical functioning (significance) $p = 0.007$ Role Limitations due to physical problems (significance) $p = 0.012$ $p = 0.020$ Energy (significance) $p = 0.049$ $p = 0.046$ Social functioning (significance) $p = 0.007$ $p = 0.046$ Social functioning (significance) $p = 0.007$ $p = 0.046$ Social functioning (significance) $p = 0.007$ $p = 0.046$ Social functioning (significance) $p = 0.007$ $p = 0.046$ Social functioning (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to physical problems (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to emotionel problems (significance) $p = 0.039$ $p = 0.031$ Energy (significance) $p = 0.049$ $p = 0.049$	General health (significance)	1			
Physical functioning (significance) $p = 0.007$ Role Limitations due to physical problems (significance) $p = 0.012$ $p = 0.020$ Energy (significance) $p = 0.020$ $p = 0.020$ Energy (significance) $p = 0.049$ $p = 0.046$ Social functioning (significance) $p = 0.007$ $p = 0.046$ Social functioning (significance) $p = 0.007$ $p = 0.046$ Saceline us 12 week follow-up** $p = 0.039$ $p = 0.031$ Role Limitations due to physical problems (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to emotionel problems (significance) $p = 0.039$ $p = 0.031$ Role Limitations due to emotionel problems (significance) $p = 0.039$ $p = 0.031$ Energy (significance) Emotional well-being (significance) $p = 0.049$	Sweek vs 12 week followun**	1			
Role Limitations due to physical problems (significance) p = 0.012 p = 0.020 Role Limitations due to to motionel problems (significance) p = 0.049 Emotional well-being (significance) p = 0.007 p = 0.046 Social functioning (significance) p = 0.007 p = 0.046 General health (significance) p = 0.007 p = 0.046 Baseline us 12 week follow up ** Physical Antectioning (significance) p = 0.039 Role Limitations due to physical problems (significance) p = 0.039 p = 0.031 Role Limitations due to emotionel problems (significance) p = 0.039 p = 0.031 Energy (significance) p = 0.049 10001			n = 0.007		
Role Limitations due to emotionel problems (significance) p = 0.049 Energy (significance) p = 0.044 Social functioning (significance) p = 0.046 Pain (significance) p = 0.046 General health (significance) p = 0.046 Social functioning (significance) p = 0.033 Basceline vs 12 week follow-up** Physical functioning (significance) Role Limitations due to physical problems (significance) p = 0.039 Role Limitations due to emotionel problems (significance) p = 0.039 Emotional well-being (significance) p = 0.049				n = 0.020	
Energy (significance) p = 0.049 Emotional well-being (significance) p = 0.044 Social functioning (significance) p = 0.007 Pain (significance) p = 0.007 Baseline us 12 week follow-up** Physical functioning (significance) Role Limitations due to physical problems (significance) Role Limitations due to emotionel problems (significance) Emotional well-being (significance) Emotional well-being (significance) Emotional well-being (significance) Social functioning (significance) Social functioning (significance) P = 0.049			p = 0101L	p = 0.020	
Emotional well-being (significance) p = 0.044 Social functioning (significance) p = 0.007 Beneral health (significance) p = 0.007 Baseline vs. 12 week follow-up** Physical functioning (significance) Role Limitations due to physical problems (significance) p = 0.039 Beneral health (significance) p = 0.039 Enotional well-being (significance) p = 0.039 Enotional well-being (significance) p = 0.039			n = 0.049		
Social functioning (significance) p = 0.007 p = 0.046 Pain (significance) Bit (significance) Bit (significance) Social functioning (significance) Bit (significance) Bit (significance) Role Limitations due to physical problems (significance) p = 0.039 p = 0.031 Role Limitations due to emotionel problems (significance) Bit (significance) Bit (significance) Emotional well-being (significance) p = 0.049 Bit (significance)			,	n = 0.044	
Pain (significance) General health (significance) Baseline iss 12 week follow-up** Physical functioning (significance) Role Limitations due to physical problems (significance) Role Limitations due to enotionel problems (significance) Energy (significance) Enotional well-being (significance) Social functioning (significance) Social functioning (significance) p = 0.049			p = 0.007		
General health (significance) Baseline vs. 12 week follow-up** Physical functioning (significance) Role Limitations due to physical problems (significance) Role Limitations due to emotionel problems (significance) Energy (significance) Emotional well-being (significance) Solal functioning (significance) p = 0.049					
Physical functioning (significance) p = 0.039 p = 0.031 Role Limitations due to physical problems (significance) p = 0.039 p = 0.031 Role Limitations due to emotionel problems (significance) Emotional well-being (significance) Soluti functioning (significance) Soluti functioning (significance) p = 0.049 Soluti functioning (significance)					
Physical functioning (significance) p = 0.039 p = 0.031 Role Limitations due to physical problems (significance) p = 0.039 p = 0.031 Role Limitations due to emotionel problems (significance) Emotional well-being (significance) Soluti functioning (significance) Soluti functioning (significance) p = 0.049 Soluti functioning (significance)					
Role Limitations due to physical problems (significance) p = 0.039 p = 0.031 Role Limitations due to emotionel problems (significance) Energy (significance) Femoria Vale-Being (significance) Social functioning (significance) p = 0.049 P					
Role Limitations due to emotionel problems (significance) Energy (significance) Emotional well-being (significance) Social functioning (significance) p = 0.049					
Energy (significance) Emotional well-being (significance) Social functioning (significance) p = 0.049			p = 0.039	p = 0.031	
Emotional well-being (significance) Social functioning (significance) p = 0.049					
Social functioning (significance) p = 0.049					
Pain (significance) p = 0.030					
General health (significance)			p = 0.030		

*Measured using Mann-Whitney U test **Measured using Wilcoxon-Ranked test

If not significant, p-value was left blank