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## CROSSFIRE

(Combined Randomised and Observational Study of  
Surgery for Fractures In the distal Radius in the Elderly)

CROSSFIRE Study Group

# CROSSFIRE team

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Research

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## **Surgical Plating vs Closed Reduction for Fractures in the Distal Radius in Older Patients A Randomized Clinical Trial**

The Combined Randomised and Observational Study of Surgery for Fractures in the Distal Radius in the Elderly (CROSSFIRE) Study Group

**Invited Commentary**

## **A Prospective Randomized Study With No Clinically Important Differences in Closed vs Open Treatment for Distal Radius Fracture in Elderly Individuals**

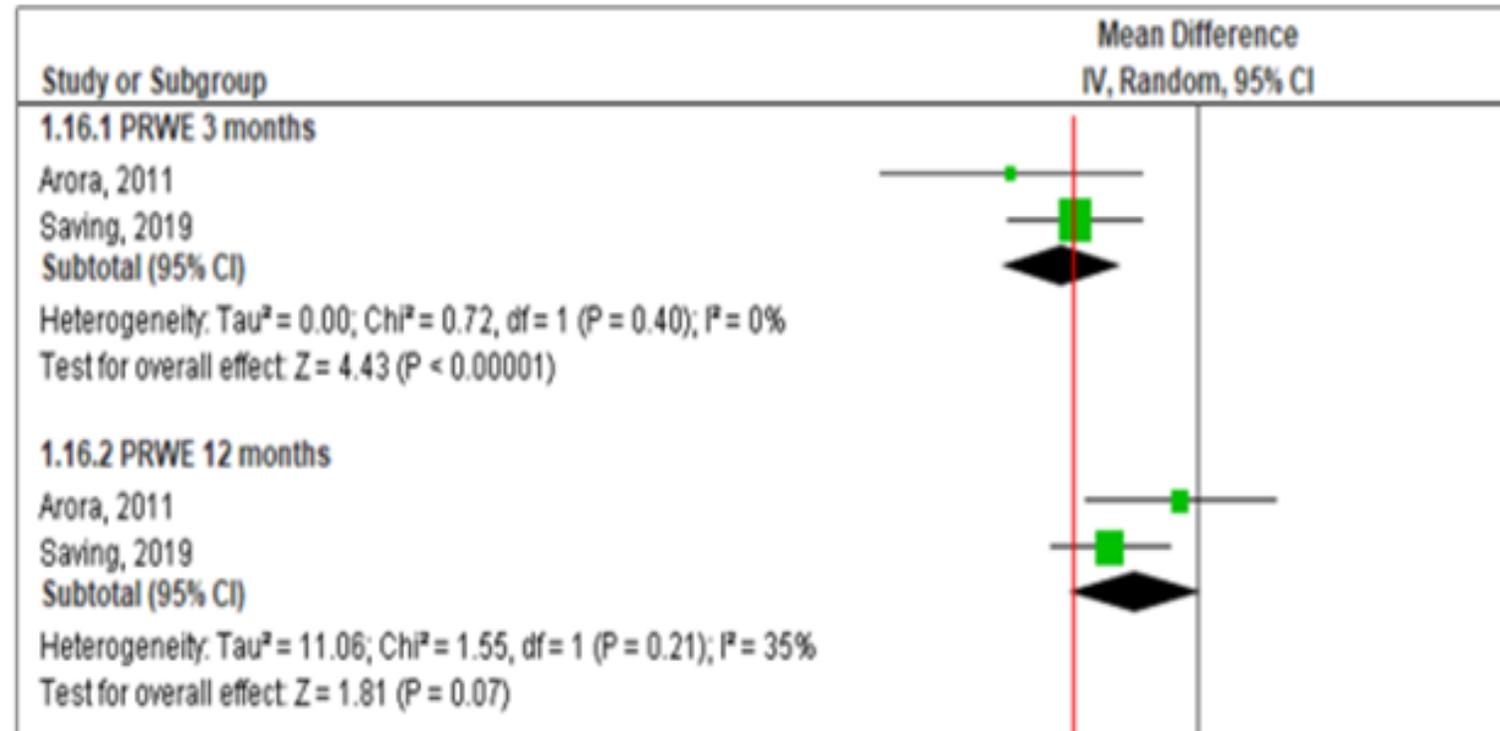
E. Gene Deune, MD, MBA

# Background

- Distal radius fractures are common in older population
- High societal burden e.g. cost to health systems \$130M annually
- Two main treatments
  - Closed reduction and casting (CR)
  - Internal fixation with volar locking plate (VLP)
- Considerable practice variation based on surgeon preference

# Rationale – what is known

- 10-fold cost differential (VLP:CR)
- Patient-reported pain and function;
  - Early benefit from VLP
  - By 12 months, little difference
- Major complications: significantly higher rates with surgical treatments



# Aims

- Primary aim: is volar plating superior to closed reduction for patient-reported pain and function (PRWE) at 12 months?
- Secondary aims: function at 3 and 24 months, pain, HRQoL, complications, treatment success, bother at 3, 12 and 24 months, therapy utilisation at 3 months, radiographic

# Methods – recruitment and PICOS

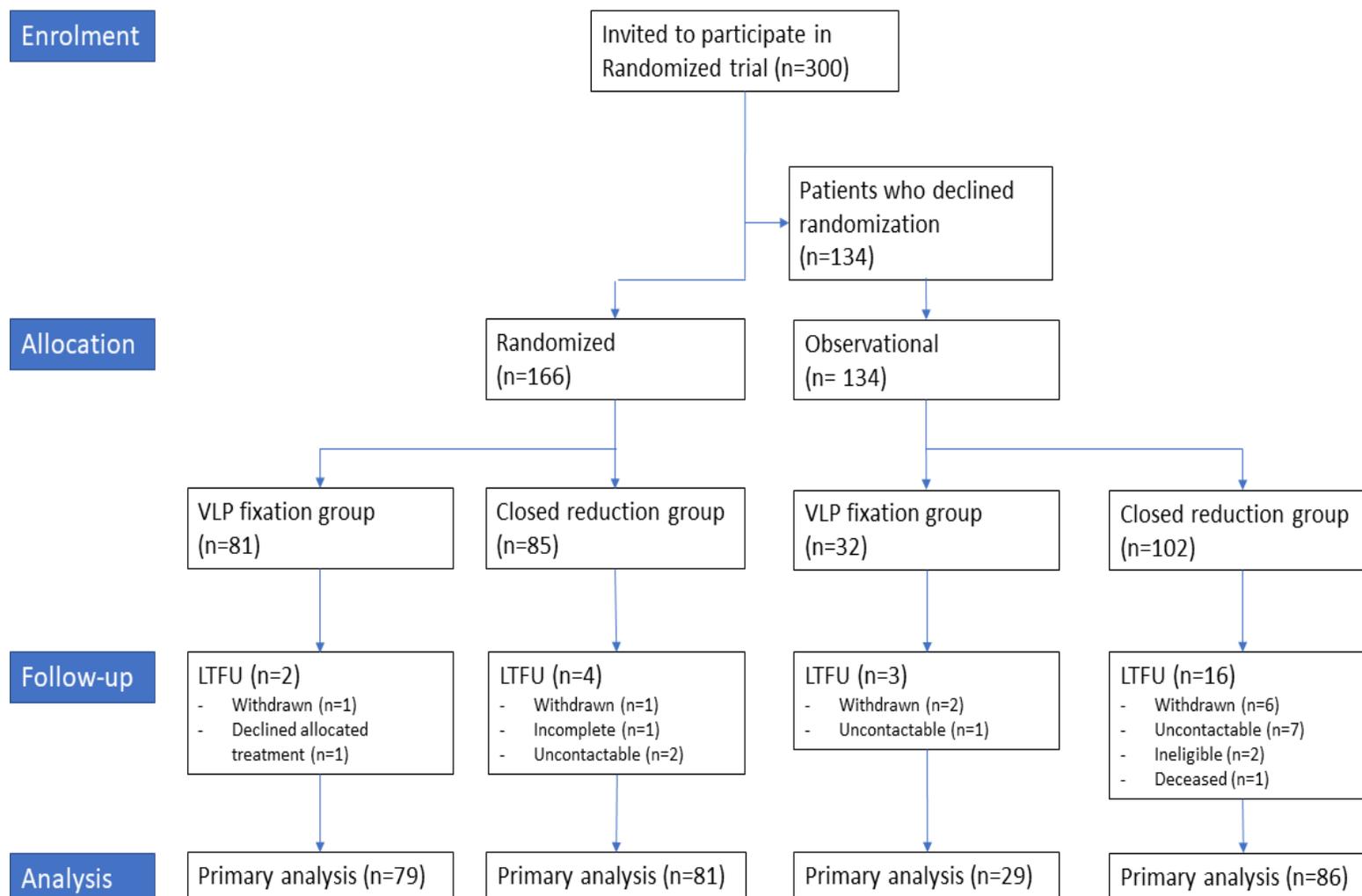
- RCT, 19 recruiting centres in Australia and NZ, 2016-18
  - Participants recruited from emergency departments
  - Centrally randomised and stratified by age, gender and site
  - Outcomes gathered by blinded researcher
- **P** – type A or C DRF, 60 years +, independent
- **I** – VLP fixation
- **C** – CR and cast immobilisation
- **O** – Primary: PRWE. Secondary: DASH, EQ-5D-5L, pain, complications, treatment success, bother, therapy utilisation
- **S** – RCT with parallel observational cohort; generalisability

# Methods – sample size and statistical analysis

- Sample size (RCT): 160 (80 each treatment group)
  - Min. clinically important difference (MCID) of 14 points on PRWE
  - 90% power at 5% significance
  - Allow for 20% loss to follow up
- Primary analysis: intention to treat
- Sensitivity analyses: as-treated and per-protocol

# Results – flow through trial

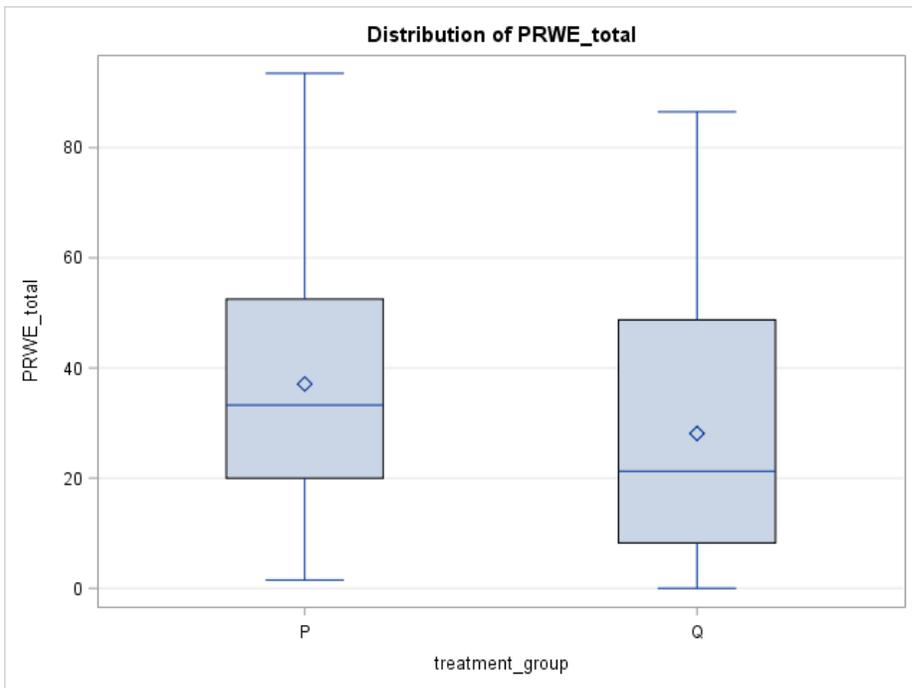
- 300 eligible participants
- 166 RCT
- 134 observ
- Baseline characteristics similar



# Main findings

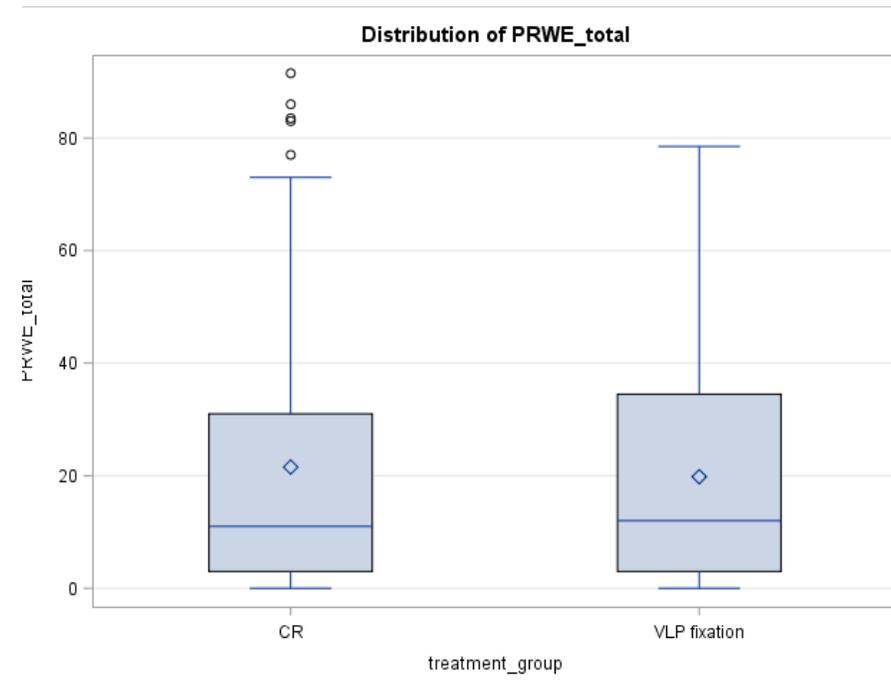
## 3 months

MD=9 points, MCID=14 points



## 12 months

MD=1.7 points



# Main findings

- Secondary outcomes
  - No difference in HRQoL, pain (NRS), bother with appearance
  - Significant difference;
    - Treatment success
    - Therapy utilisation

Secondary outcome	Results		Mean diff (statistical significance)	Clinical importance
	CR	VLP Fixation		
PRWE at 3 months	37.1	28.1	9.0 (p=0.01)	No
DASH at 12 months	19.6	18.7	0.9 (p=0.79)	No
HRQoL (EQ-utility index) at 12 mths	0.70	0.69	0.01 (p=0.76)	No
HRQoL (EQ-VAS) at 12 months	73.9	72.6	1.3 (p=0.67)	No
Pain (NRS, 0-10) at 12 months	1.0	1.1	0.09 (p=0.79)	No
Treatment success at 12 months	70%	89%	(p<0.01)	Yes
Bothered by appearance at 12 months?	21%	8%	(p=0.16)	No
Therapy utilisation at 3 months	54%	72%	(p=0.02)	Yes

# Main findings

- Complications
  - Overall rates were low and not significantly different between treatment groups
  - Reoperation
  - Fracture non-union

	CR (n=84)	VLP fixation (n=80)	Risk ratio (95% CI) VLP vs CR
Any complications	12 (14%)	6 (8%)	0.53 (0.21 to 1.33)
Deep infection	1 (1%)	-	N/A
Reoperation	6 <sup>a</sup> (7%)	2 <sup>b</sup> (3%)	0.35 (0.07 to 1.68)
Neuropathy	3 (4%)	3 (4%)	1.05 (0.22 to 5.05)
Tendon irritation req. treatment	-	1 (1%)	N/A
Tendon rupture	1 (1%)	1 (1%)	1.05 (0.07 to 16.50)
Fracture non-union at 6 months	4 (5%)	-	N/A
Implant failure	1 (1%) <sup>b</sup>	-	N/A
Complex regional pain syndrome	2 (2%)	1 (1%)	0.53 (0.05 to 5.68)
Death	-	-	N/A

<sup>[a]</sup> Reoperations were for carpal tunnel release (n=1), fracture non-union requiring plating (n=1), hardware failure after early crossover to surgery (n=1), post-op infection requiring surgical washout after crossing over to surgery (n=1), and osteotomy at 6 months post initial treatment (n=2)

<sup>[b]</sup> Reoperations were for removal of hardware following metal allergy (n=1), and removal of hardware following tendon irritation at 3 months post initial treatment

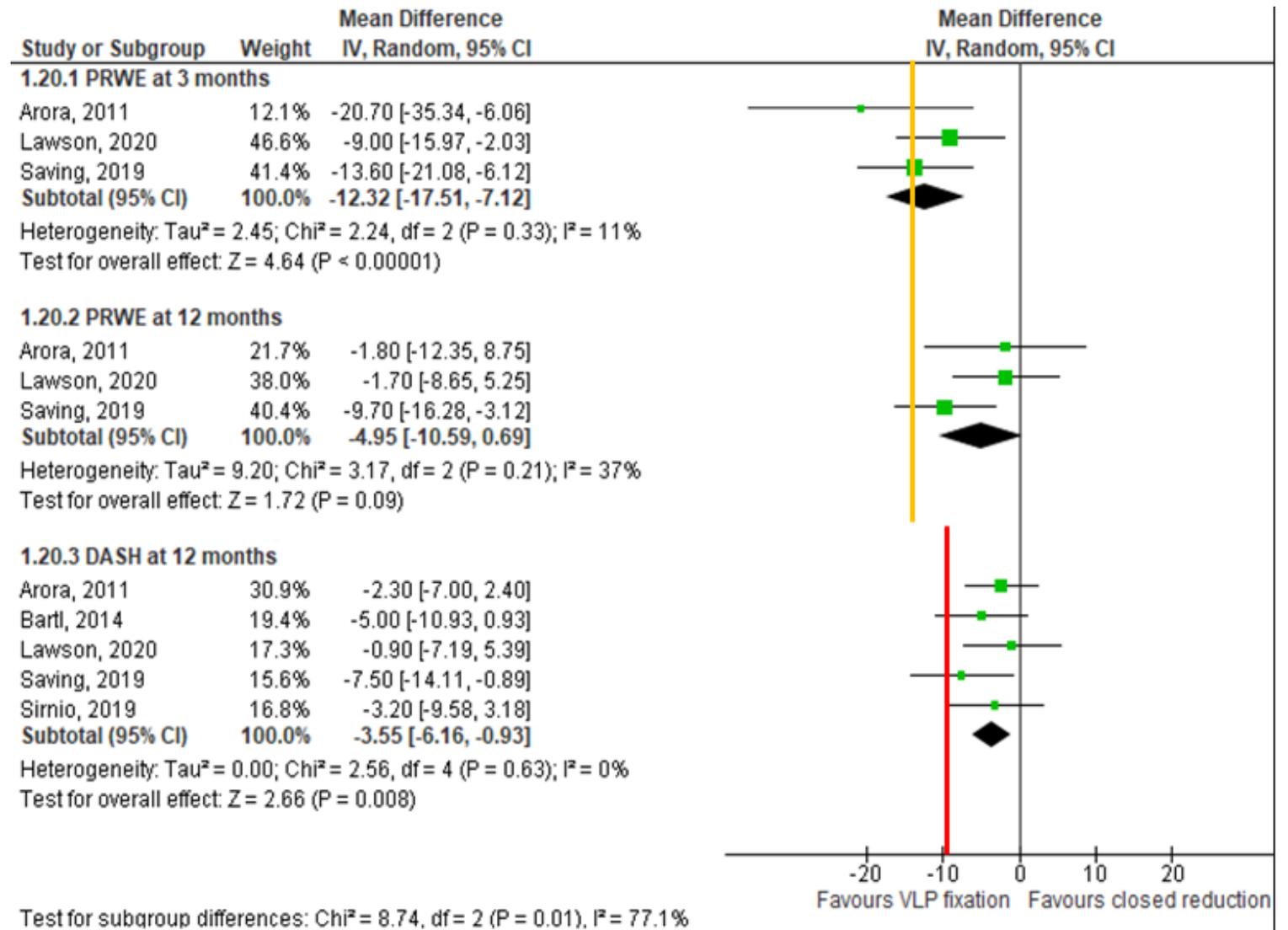
# Main findings

- Sensitivity analysis; low crossover
- Observational cohort similar to RCT; generalisable
- Outcomes yet to be reported
  - Radiographic (2021)
  - 2 year outcomes (2021)
  - Economic analysis (2021)

# Discussion

Similar results to other RCTs i.e.

- Early benefit from VLP
- No difference by 12 months



# Strengths and limitation

<b>Strengths</b>	<b>Limitations</b>
Confounding minimised by central randomisation and balancing on age, gender, site	Participants were not blinded so risk of performance and detection bias was high
Little difference between RCT and observational cohorts. Outcomes generalisable to population	No screening log so perhaps not all eligible patients offered participation
Low rate of loss to follow-up in RCT (4%)	
Low rate of crossover (3%)	

# Conclusion

In the treatment of wrist fractures in patients aged 60 years and over, VLP fixation resulted in better early (3 months) functional recovery than CR but the between group difference did not reach a level of clinical importance. By 12 months post treatment, there was no between group difference in wrist pain and function.

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