

The Efficacy and Safety of a Surgeon-led Virtual Fracture Clinic in a Level 1 Trauma Hospital

Introduction

- The demand for orthopaedic outpatient clinic appointments at our institution has been rising without an increase in capacity.
- Virtual Fracture Clinics (VFC) have been successfully implemented in the United Kingdom for Emergency Department (ED) referred ambulatory musculoskeletal cases and have shown that select injuries can be managed safely in the community with orthopaedic advice.

Aim

The project aimed to:

- Implement a surgeon led VFC in a level 1 trauma hospital; and
- Investigate the resource efficacy and safety of this new model of care.

Methods

Study design

Pre and post intervention analysis with historical control 474 days pre VFC and post VFC implementation (November 2015 – June 2018).

Ethics approval

Ethics approval for the research was obtained from the Melbourne Health Human Research Ethics Committee.

Participants

ED referred ambulatory patients with a single musculoskeletal injury.

VFC Model of Care

A VFC was implemented in March 2017.

- Four days per week an orthopaedic surgeon reviewed the digital imaging and clinical notes of ED referrals and assigned patients to one of the following management options:

- outpatient clinic
- virtual discharge (+/- primary care physician management)
- another specialty/hospital
- surgery



- An advanced practice physiotherapist called patients to inform them of the management plan and rehabilitation process.
- Patients were given the option to call or email the VFC with any queries or concerns.

Outcomes of interest

Efficacy

Primary outcome:

- clinic resource utilisation per referral

Secondary outcomes:

- proportion of patients directly discharged by the VFC
- wait time from ED discharge to first orthopaedic contact

Safety

Primary outcome:

- unplanned hospital re-attendances: ED, outpatient clinic or surgery

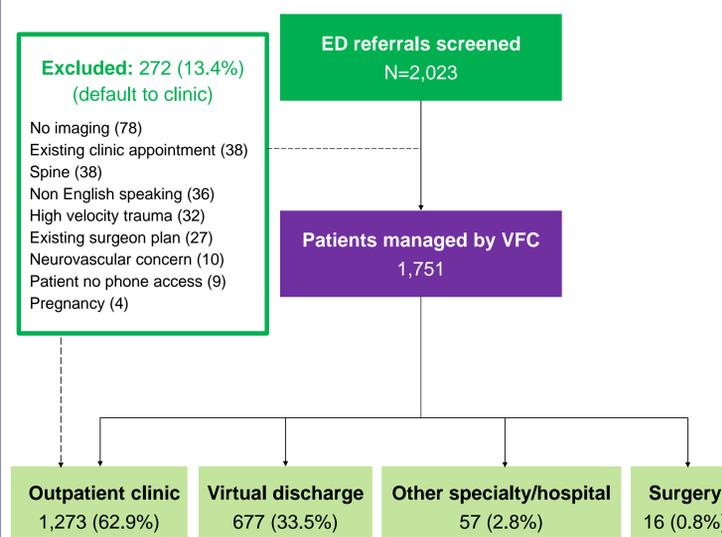
Secondary outcome:

- Adverse outcomes

Data management

Data was extracted from existing hospital databases and from a prospectively managed VFC database. Numerical data were summarised as mean (min,max) or median (Q1,Q3) and categorical variables were summarised as n (%). Chi squared test or Fisher's exact test were used to compare categorical data between pre and post VFC groups and Wilcoxon Mann-Whitney test was used for numerical comparisons.

Fig 1. Flow of participants post-VFC implementation



Results

PARTICIPANTS

The demographic characteristics of the patients pre and post intervention were similar (Table 1).

Table 1. Participant characteristics

	Pre VFC	Post VFC	p value
Number of referrals	1,899	2,023	
Male, n (%)	1,086 (57.2)	1,127 (55.7)	0.35
Age, median (IQR)	36 (26,55)	37 (26,56)	0.69
- Age Females, median (IQR)	48 (30,66)	46 (29,64)	0.27
- Age Males, median (IQR)	32 (25,45)	32 (24,46)	0.96
Injury classification, n (%)			0.56
Upper Limb	1,107 (58)	1,166 (58)	
Lower limb	740 (39)	797 (39)	
Spine	39 (2)	38 (2)	
Axial	5 (0)	5 (0)	
Multiple areas	8 (0)	17 (1)	

EFFICACY

Clinic utilisation (within 90 days of screening)

- On average 1.06 appointments were required per ED referral post implementation versus 1.67 pre VFC. This equated to a 38.5% reduction in clinic appointments per referral as a result of the intervention.
- There was a reduction of 32.1% in the total attended clinic appointments pre and post intervention (Table 2).

Table 2. Orthopaedic outpatient clinic attendance

	Pre-VFC	Post-VFC	p-value
Attended	3,168	2,151	0.11

- 37.1% of referrals were virtually discharged without patients attending an outpatient clinic appointment (Fig 1).

Wait time for orthopaedic contact

- There was a significant reduction in the median (IQR) wait time from ED discharge to first orthopaedic contact; 2 (1,3) days post VFC implementation compared to 7 (5,9) days pre VFC (p<0.01).

Systematic failure rate

- 8% of planned VFC cases were not possible:
 - 5.9% did not respond to phone contact
 - 2.1% declined

SAFETY

Unplanned hospital attendances

- 11.7% of virtually managed patients had an unplanned event:
 - 10.5% clinic appointment
 - 1.2% surgery

- There were fewer ED re-attendances within 30 days of initial attendance during the post VFC period compared to pre intervention; 105 versus 123 respectively (p=0.49). These re-attendances were not associated with an adverse outcome.

Adverse events

- There were no reported adverse outcomes during the post VFC period within 90 days post screening.

Discussion

The implementation of a VFC at our institution resulted in:

- a 38.5% reduction in clinic resource use per referral
- a 32.1% reduction in clinic appointments attended
- VFC direct discharge rate of 37.1%
- a significant reduction in patient wait times to first orthopaedic contact
- an unplanned hospital attendance rate of 11.7%
- no increase in ED re-attendances and no reported adverse events

Implications

- This model of care appears to be a efficacious alternative for the management of select ambulatory musculoskeletal conditions.
- The improvement in resource utilisation did not come at the expense of safety.
- This model appears applicable to Australian healthcare.
- The next step is to conduct a cost benefit analysis.

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