

## The Outreach Virtual Fracture Clinic – a Pilot Report of the Initial Nine Months

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### Abstract

#### Aim

The virtual fracture clinic (VFC) enables the safe, cost-effective delivery of high-quality patient-centred fracture care, whilst reducing hospital footfall. Within our institution, an Outreach VFC was launched, accepting a pre-defined range of trauma referrals from the outreach centre's emergency department (ED).

#### Methods

The initial nine months' worth of cases referred to the Outreach VFC were assessed. The injury pattern, time to review, treatment plan and discharge destination of each referred patient were examined.

#### Results

A total of 822 patients were referred to the Outreach VFC during its initial nine months in operation. Owing to COVID-19-related alterations in the patient pathway, 58.1% of patients were referred on to fracture clinic/ED, with 34.4% of patients being referred for physiotherapy input. 44.9% of patients were reviewed at the Outreach VFC within 72 hours of ED presentation, with 88.6% of patients reviewed within 7 days. The Outreach VFC pilot initiative saved the Dublin Midlands Hospitals Group approximately €83,022 over nine months.

#### Discussion/Conclusion

The Outreach VFC model represents a novel approach to trauma care delivery with advantages for patient and hospital alike. Rural communities serve to benefit from its future implementation and

the remote management of orthopaedic trauma. The Outreach VFC model provides a means of delivering safe and timely orthopaedic care whilst maintaining high levels of patient satisfaction.

## **Introduction**

The Virtual Fracture Clinic (VFC) has been shown to be a viable and efficient option for the treatment of a wide array of orthopaedic patient populations<sup>1</sup>. Prior to its rollout across the UK and Irish healthcare systems, the concept of the VFC was initially established by the Glasgow Royal Infirmary Group in October 2011<sup>2</sup>. Since its inception, the VFC has continually provided a means of delivering safe, cost-effective orthopaedic care in a reproducible fashion whilst upholding high levels of safety and patient satisfaction<sup>2,3</sup>.

There are considerable advantages to delivering VFC-based care, including enhanced healthcare value, improving the overall patient experience, as well as limiting the transmission of nosocomial disease, including COVID-19 infection, by downsizing patient volume in the face-to-face (F2F) fracture clinics<sup>4</sup>. Waiting times for patients requiring a F2F appointment are significantly reduced as a result<sup>6,7</sup>. The VFC model lessens the socio-economic burden for patients compared with traditional fracture clinics, by reducing the number of workdays missed by adult patients, and parents of paediatric patients, attending the VFC, whilst obviating the need for paediatric patients to miss invaluable school hours<sup>6,7</sup>. Virtual appointments obviate the need for rural patients to commute long distances, conveying environmental advantages, whilst allowing patients to avoid considerable travel expenses<sup>10</sup>.

In a shift from usual practice within our institution, an Outreach VFC serving patients attending Naas General Hospital (NGH) was commenced in order to facilitate referrals from the offsite emergency department (ED). Consultant-lead virtual care was provided by the Tallaght University Hospital (TUH) Consultant Orthopaedic Surgeons, by way of an offsite clinic session, within the NGH outpatient department. This model for orthopaedic care delivery became evermore necessary during the COVID-19 pandemic, with the emergence of new targets for reduced hospital footfall. International literature pertaining to similar novel programmes of orthopaedic care provision is scarce. The successes and challenges of this pilot programme are discussed within this manuscript, examining outcomes for patients and hospital alike, during this dynamic period of healthcare delivery.

## **Methods**

TUH is one of Ireland's leading trauma centres, covering a total population in excess of 430,000 people and providing an orthopaedic service to NGH<sup>8</sup>. During a short trial period in late 2019, the Outreach VFC replaced one fracture clinic per week at NGH. With its formal commencement and the coinciding onset of the COVID-19 pandemic, the Outreach VFC was expanded to replace all five weekly fracture clinics. Operating at full capacity since March 2020, the Outreach VFC is conducted by NGH-based ED Advanced Nurse Practitioners (ANP's), outpatient orthopaedic nursing staff and

physiotherapy staff, providing high-quality orthopaedic nursing care and facilitating specialised physiotherapy clinics, similar to 'Satellite VFC' in operation between Midlands Regional Hospital Portlaoise (MRHP) and Midlands Regional Hospital Tullamore (MRHT)<sup>9</sup>.

Following initial assessment in the outreach centre's ED, patients with suitable, pre-defined injury patterns were referred to the next available Outreach VFC. With the onset of the COVID-19 pandemic, the usual patient care pathway was adapted. An extended array of injuries became eligible for referral to the Outreach VFC, given the need for virtual patient care where possible. Patients presenting to the ED were provided with information leaflets pertaining to their injury, were treated with a boot, splint or orthotic device, and were referred on to the next available Outreach VFC. Cases requiring immediate review or surgical fixation were referred to the on-call orthopaedic team in the main orthopaedic unit.

Eligible patients were reviewed in the next available Outreach VFC. Orthopaedic consultants from the main orthopaedic unit attended each Outreach VFC, reviewing each patient's case and radiological findings before formulating a management plan. Such plans were devised in consultation with all members of the multi-disciplinary care team. Patients were informed of their management plan via telephone that same day. All decisions made were documented and a letter was dictated to both the patient and their general practitioner (GP).

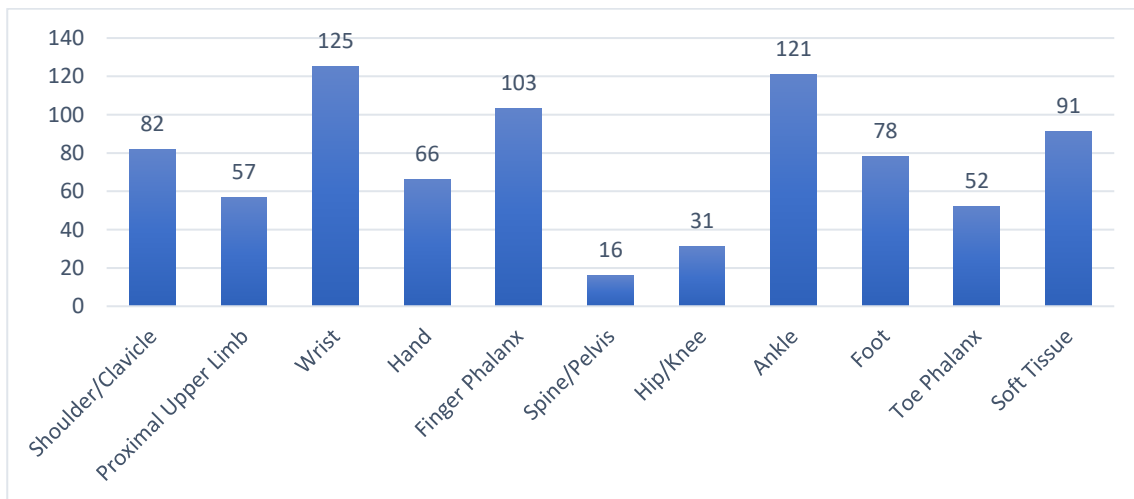
Patients reviewed at the Outreach VFC experienced one of a number of outcomes. They were either directly discharged with relevant advice and information leaflets, referred to specialised physiotherapy-led clinics or referred to the general trauma clinic for clinical review where necessary. Each patient was provided with contact details for the orthopaedic department and were encouraged to immediately re-contact the department should concerns arise. Where suitable, such patients were given an appointment for the next available fracture clinic, ensuring the provision of safe trauma care.

A regularly updated prospective database of all VFC attendees was examined. The cases of the first 822 patients referred to the VFC were assessed, with each patient's Outreach VFC outcome assessed as the primary outcome measure. Levels of returns to the trauma clinic were noted, as were patients that were referred for operative management. The time elapsed from each patient's ED attendance to their case review at the Outreach VFC was compared to the British Orthopaedic Association (BOA) guidelines.

## **Results**

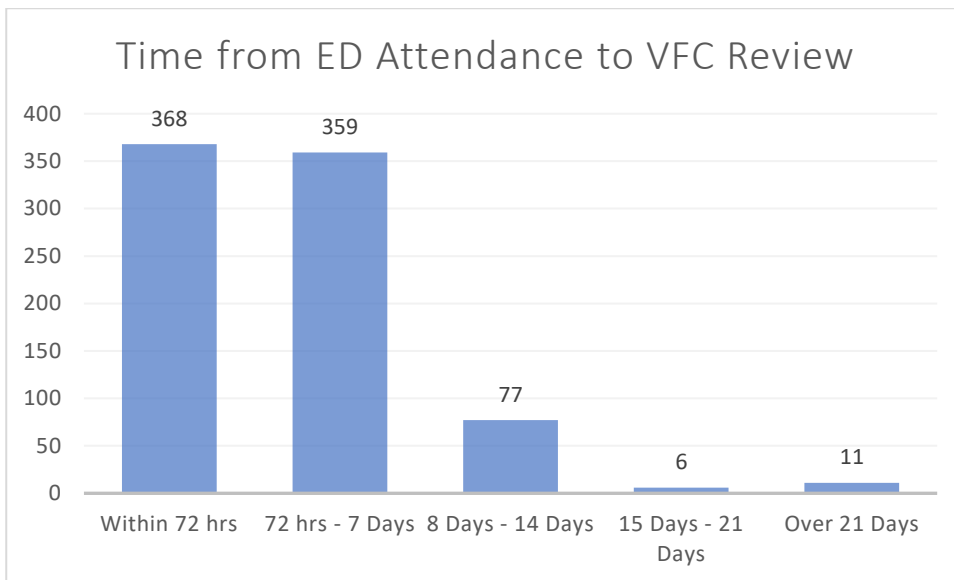
During its initial nine-months in operation, between the 25<sup>th</sup> March 2020 and the 2<sup>nd</sup> November 2020, there were a total of 822 patients referred to the Outreach VFC. From the outset, the Outreach VFC operated under the added pressures and constraints of the global COVID-19 pandemic.

Initially, the Outreach VFC was intended for the referral of minor, non-urgent fracture patterns. With the onset of the COVID-19 pandemic, a wider range of orthopaedic injuries were accepted for referral to the Outreach VFC. Wrist fractures represented the most commonly referred fractures, comprising 15.2% of referrals, followed by fractures of the ankle, representing 14.7%, and finger phalanx fractures thereafter comprised 12.6% of referrals. Soft tissue injuries of all anatomical locations represented 11.2% of referrals to the Outreach VFC. The range of referral diagnoses is demonstrated in *Table 1*.



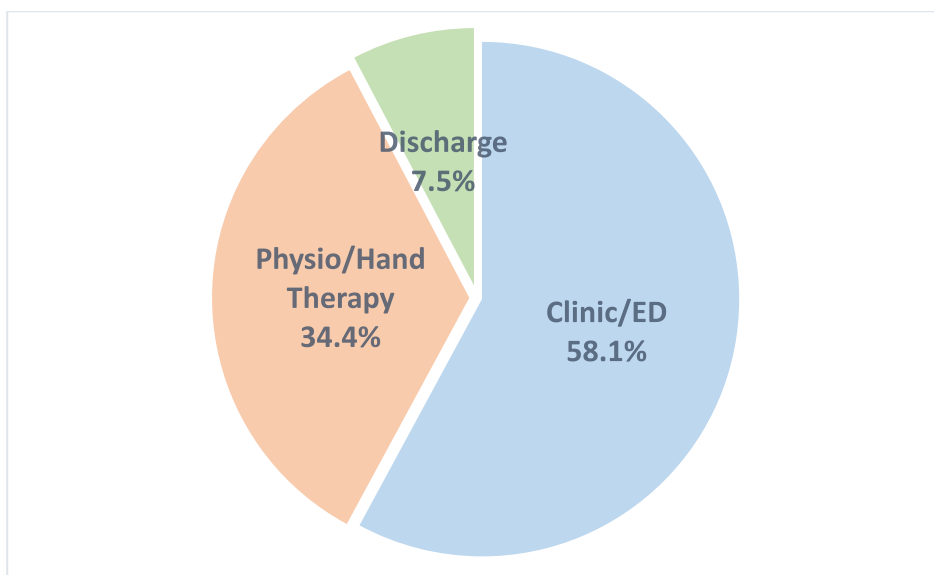
*Table 1* – an overview of the diagnoses referred to the Outreach VFC.

Following referral to the Outreach VFC, 369 (44.9%) patients were reviewed within seventy-two hours. 359 (43.7%) referred patients were seen between seventy-two hours and seven days following their initial presentation to ED. 77 (9.4%) patients were reviewed between seven and fourteen days of initial presentation, 6 (0.7%) were reviewed between fourteen and twenty-one days and 11 (1.3%) were reviewed after twenty-one days of Outreach VFC referral. *Table 2* outlines the timeframe, following presentation, within which patients' cases were reviewed at the Outreach VFC.



**Table 2** – 88.6% of patients referred to the VFC were reviewed within seven days.

With regards to outcomes, 460 (56.0%) patients were referred to the face-to-face fracture clinic for either clinical review or follow-up radiograph, whilst 283 (34.4%) patients were referred for follow-up rehabilitation in a physiotherapy-led or hand therapy clinic. 62 (7.5%) patients were discharged directly from the outreach VFC, 13 (1.6%) were re-referred to the ED, 3 (0.4%) underwent surgery in the main orthopaedic unit and 1 (0.1%) patient received follow-up care overseas. A graphical representation of Outreach VFC patients' discharge destinations is shown in *Figure 1*.



**Figure 1** – Discharge destinations following Outreach VFC review.

## Discussion

The advent of the VFC has proven to uphold high levels of patient care, with all four British Orthopaedic Association Standards for Trauma (BOAST) guidelines being met 99% of the time for all four standards <sup>[5]</sup>. Anecdotally, orthopaedic patients moving through the Outreach VFC service experience high rates of satisfaction, in keeping with literature describing how patients prefer safe, virtual care to that of the face-to-face fracture clinic <sup>[3]</sup>. The Outreach VFC permits the provision of orthopaedic care that facilitates streamlined patient flow and an enhanced healthcare value, whilst maintaining high standards of care.

Outreach VFC attendance conveys considerable socio-economic benefits for patients and their families. The Outreach VFC allows for the mitigation of lost work hours for both fracture clinic patients and the parents of paediatric fracture clinic attendees. This carries economic benefit for both patients, as well as parents, and their employers. Furthermore, patients avoid travel and parking costs incurred whilst attending a hospital appointment <sup>[10]</sup>. The Outreach VFC conveys educational benefits to paediatric fracture patients, with a reduction in the loss of critical school hours in order to attend clinic appointments <sup>[6, 7]</sup>. There are substantial environmental advantages to hosting the Outreach VFC. Reduced levels of commuting for patients and staff result in lower levels of carbon emissions, with patients commuting up to fifty kilometres one-way to attend NGH. Such long-distance return journeys are now known to be unnecessary. The Outreach VFC likely goes some way in tackling the urban-rural health disparities that exist amongst our patient cohort <sup>[11]</sup>. Although telemedicine practices are well established internationally, particularly within the world's most vast countries, the Outreach VFC process amongst Irish populations remains relatively novel <sup>[9]</sup>. There are compelling social, economic and environmental advantages to the Outreach VFC process for patients and their local community.

Despite a high volume of trauma patient referrals, particularly during the initial weeks of the COVID-19 pandemic, 44.9% of patients were reviewed in the Outreach VFC within seventy-two hours of referral. 88.6% of all referred patients had their case reviewed by a consultant orthopaedic surgeon within seven days of their initial presentation to the ED. These figures represent an impressive compliance with the British Orthopaedic Association's recommendation for the provision of a seven-day clinic service, where possible, for minor orthopaedic injuries during the COVID-19 pandemic<sup>12</sup>. Therefore, the use of the Outreach VFC model allows for a timely consultant review of each patient's case following their initial presentation to the ED.

Hospitals should look favourably on the idea of the Outreach VFC from a resource utilisation perspective. There are significant cost savings to be made, with reduced levels of staffing required to operate VFC's and a higher hourly caseload compared with traditional fracture clinic models<sup>13,14</sup>. The reduction in the quantity and volume of resource-intense face-to-face fracture clinics allows for a re-allocation of resources to facilitate theatre time or to tackle elective orthopaedic waiting lists. The Outreach VFC model may offer an alternative to the current practice of continually increasing spending in an effort to combat the ever-growing fracture clinic workload. For hospitals, there is an

average 40% reduction in the price per patient attending a VFC compared with traditional face-to-face fracture clinics<sup>13</sup>. A previous cost analysis of a similar Irish VFC model revealed a cost saving of €101 per patient compared with the use of traditional fracture clinics<sup>15</sup>. Such figures convey a total saving of approximately €83,022 for the Dublin Midlands Hospital Group during the Outreach VFC's initial nine months in operation.

53% of patients reviewed in the Outreach VFC were subsequently referred to our face-to-face fracture clinic. Compared with similar virtual models of care prior to the COVID-19 pandemic, our Outreach VFC had a higher proportion of fracture clinic referrals, primarily due to the acceptance of a wider scope of injury patterns. Stable fracture patterns, with low associated morbidity and well-identified natural histories are ideal candidates for Outreach VFC management, given their successful healing rates with splint immobilisation <sup>[16]</sup>. National COVID-19 pandemic restrictions targeting a reduced hospital foot fall resulted in an extension of the range of orthopaedic injury patterns accepted for Outreach VFC referral. This, therefore, resulted in a higher proportion of complex fracture patterns being reviewed at the Outreach VFC, with a subsequent increase in the volume of cases requiring onward referral to a face-to-face fracture clinic.

The inception of the Outreach VFC model arose from advancements across multiple facets of musculoskeletal medicine. Advancements in the VFC process over time have allowed for the safe and efficient delivery of virtual orthopaedic care, whilst maintaining patient satisfaction<sup>17,18</sup>. Recent technological advancements in healthcare delivery have facilitated the development and improvement of the Outreach VFC process. Increases in telemedicine availability, accessibility and affordability have been pivotal in widening the use of VFC's, particularly during the current COVID-19 pandemic<sup>19,20</sup>. Previously, the transmission of quality radiological imaging represented a major hurdle in developing remote consultations. The safe and timely transmission of radiological imaging to the treating consultant at the Outreach VFC is performed using a digitalised national system, the "National Integrated Medical Imaging System" or NIMIS<sup>21</sup>. Remote working, a hot topic in light of the COVID-19 pandemic, will become more accessible to members of the Outreach VFC team with the future implementation of similar secure technological systems across hospital groups.

With the use of the Outreach VFC, there is an overall reduction in the quantity of orthopaedic trauma clinic referrals<sup>22</sup>. This reduction in hospital footfall is vital in curbing the spread of nosocomial infections and community acquired disease. During the current pandemic, the emergent need to curtail the spread of COVID-19 infection is of top priority for hospitals and patients alike. Hospitals must therefore enforce 'social distancing'<sup>23</sup>, a task made easier by a reduction in trauma clinic attendances. In addition to reduced fracture clinic referrals, patient waiting times are lessened with the use of the Outreach VFC model, adding to patient satisfaction and the provision of timely management decisions<sup>5,24</sup>.

Trauma physicians are constantly striving to provide a patient-centred care approach to fracture management. The Outreach VFC process promotes patients engaging in 'self-care', involving them in the planning of their rehabilitation and follow-up appointments. Patients engage in at least two points of communication throughout the Outreach VFC process – firstly during their initial

consultation in ED, and secondly with a follow-up phone call on the day their case is reviewed in the Outreach VFC. Patients are always provided with the orthopaedic department's contact details should problems or the need for an in-person appointment arise. This safety net is vital in providing safe care to fracture patients and bolsters overall confidence in the Outreach VFC process. Patient's trust in the Outreach VFC process is well placed with low re-review rates. This is in line with the described re-review rates of below 10% in the literature<sup>3,17</sup>.

The limitations of this report include the length of time taken to attain 822 referrals to the Outreach VFC. The NGH Outreach VFC was established in March 2020, with a relatively low initial referral volume. Dissemination of information regarding the Outreach VFC referral pathway amongst ED staff in NGH led to a subsequent increase in the referral volume. Presently, each Outreach VFC typically hosts 15-20 patients. Initially, referrals only included patients seen by the ED's Advanced Nurse Practitioners. Over time, the Outreach VFC grew to accept referrals from all ED staff. With the future development of the Outreach VFC process, units may move to accept referrals of more varied trauma patterns. There is the potential that such advancements may be accelerated in light of the current COVID-19 pandemic. With pandemic-related constraints being placed on worldwide trauma care delivery, there is expected to be an upsurge in the popularity of the Outreach VFC model of care<sup>1,25</sup>.

This outreach VFC concept evolved progressively, starting with one clinical session per week, and growing as per the demand of the referring ED in NGH. The process evolved under direct looped audit and supervision, allowing the clinic to upscale in response to the surge of the COVID-19 pandemic. The Outreach VFC proved itself to be a vital weapon in the fight against the virus, by ensuring that safe, reliable trauma care delivery was upheld. The pandemic has disrupted the trauma clinic as an entity. Virtual fracture care facilitated continuity of a fully functioning, albeit lean, trauma service, despite widespread restrictions limiting activity in other hospital domains. The persistence of trauma will ensure that fracture clinics will continue to play a major role in serving emergency departments nationwide. The VFC is proving to play an increasingly pivotal role within the hospital setting and is likely to become a requirement of all emergency departments nationwide to make use of the hub and spoke model of trauma care.

The NGH Outreach VFC is amongst the first of its class to be documented in the literature. This model of remote orthopaedic trauma care delivery conveys socio-economic advantages for patients, whilst maintaining safety and patient satisfaction. Hospitals are financially rewarded for adopting the Outreach VFC care model, with an additional reduction in the need for resource-heavy face-to-face fracture clinics. The Outreach VFC represents an opportunity for the provision of safe and cost-effective fracture care, whilst optimising the use of resources, enhancing healthcare value and maintaining a high levels of patient satisfaction.



**Declaration of Conflicts of Interest:**

The authors report no conflict of interest.

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